

CHAPTER 1

AN OVERVIEW OF ANSI/ASSP Z10.0-2019 AND ANSI/ASSP/ISO 45001-2018

In 2019, the American National Standards Institute (ANSI) approved a third edition of a standard titled *Occupational Health and Safety Management Systems*. Its secretariat is the American Society of Safety Professionals (ASSP), and its designation is ANSI/ASSP Z10.0-2019. This American standard was first approved in 2005, revised in 2012, and reaffirmed in 2017. It is commonly referred to as Z10.

Major improvements and extensions were made in the 2019 version. It is a much-improved standard. Revisions are as follows:

- Make it easier to integrate the standard with quality, environmental, and other management systems standards.
- Provide alignment with the 45001 standard.
- Are more specific concerning the significance of management leadership and the culture that management creates.
- Encourage additional worker involvement in the safety and health management system.
- Replace the term “employee” with “worker” to broaden the coverage and include certain workers that are not employed by the organization.
- Add a new section on the Context of the Organization.
- Create a new section on Support which includes resources, education, training and competence, communication, and document control process.

Advanced Safety Management: Focusing on Z10.0, 45001, and Serious Injury Prevention, Third Edition. Fred A. Manuele.

© 2020 John Wiley & Sons, Inc. Published 2020 by John Wiley & Sons, Inc.

- Extend the importance of the design requirements in which prevention through design components are now more prominent.

In 2018, the first international standard for occupational health and safety management systems was approved by an entity with significant credentials—the International Organization for Standardization (ISO, 2015). Full title of the standard is ISO 45001: *Occupational health and safety management systems—Requirements with guidance for use*. This standard is commonly referred to as 45001.

In the same year, approval was given to this international standard by ANSI to become an American standard. Its designation is ANSI/ASSP/ISO 45001-2018, and the secretariat is the American Society of Safety Professionals.

Although 45001 is based principally on BS OHSAS 18001:2007, the title of which is *Occupational health and safety management systems—Requirements*, it is considered a new international standard since numerous changes were made in the process of 18001 becoming an ISO standard. For OHSAS18001, the British Standards Institute (BSI) was the publisher. A composite of what ISO said about 45001 is as follows:

The goal of ISO 45001 is the drastic reduction of occupational injuries and diseases. It is a milestone. The standard is based on OHSAS 18001, conventions and guidelines of the International Labour Organization including ILO OSH 2001, and national standards.

It is said in the Foreword of BS OHSAS 18001:2007 that “This OSHAS Standard will be withdrawn on publication of its contents in, or as, an International Standard.” BSI has done that.

BSI has been a certifying body for 18001. On the Internet, BSI advises those organizations that are now certified to OSHAS 18001 need to migrate to ISO 45001 by March 1, 2021. As would be expected, BSI says its organization has the expertise and knowledge to help upgrade certification to ISO 45001.

SIMILARITIES AND DIFFERENCES

As readers will have noted, the titles of 45001 and Z10.0 are similar. To determine how alike the content of the standards might be, a review was made that included only the titles of the standards and the major captions in their tables of contents. Results are shown in Figure 1.1.

Figure 1.1 shows that, from a macro view, the contents of the standards are pretty much the same. Alignment of the major captions of the two standards was done intentionally by the Z10 committee to facilitate integration (Introduction of Z10.0). But there are significant differences in the subsets of the two standards as will be seen later in this chapter.

Titles of standards and major captions in tables of contents

ANSI/ASSP Z10.0–2019	ANSI/ASSP/ISO 45001 2018
Occupational health and safety Management systems	Occupational health and safety management systems—requirements with guidance for use
1. Scope, purpose and application	1. Scope
2. References	2. Normative references
3. Definitions	3. Terms and definitions
4. Strategic consideration—context of the organization	4. Context of the organization
5. Management leadership and worker participation	5. Leadership and worker participation
6. Planning	6. Planning
7. Support	7. Support
8. Implementation and operation	8. Operation
9. Evaluation and corrective action	9. Performance evaluation
10. Management review	10. Improvement

FIGURE 1.1 Comparison—Z10.0 and 45001.

Comments are made in this chapter on the following:

- History, Development, and Consensus
- Compatibility and Harmonization
- The Continual Improvement Process: The PDCA Concept
- A Major Theme
- Relating This Major Theme to Serious Injury Prevention
- Z10.0 and 45001 Are Management System Standards
- Forewords and Introductions for Z10.0 and 45001
- Word Usage – Requirements, Recommended Practices, Permissions, and Possibilities
- Composites for Z10.0 and 45001: 1.0 Through 3.0—Scope, Purpose, and Application, References, Definitions and Terms and Conditions
- Composite: 4.0 Strategic Considerations: Context of the Organization in Z10.0: 4. Context of the Organization in 45001
- Composite: 5.0 Management Leadership & Employee Participation in Z10.0: 5. Leadership and Worker Participation in 45001
- Composite: 6.0 Planning in Z10.0: 6. Planning in 45001
- Composite: 7.0 Support In Z10.0: 7. Support In 45001
- Composite: 8.0 Implementation and Operation in Z10.0: 8. Operation in 45001
- 9.0 Evaluation and Corrective Action in Z10.0: 9. Performance evaluation in 45001
- 10. Management Review in Z10.0: 10. Improvement in 45001

- Annexes, Bibliographies and Guidance Manuals (Not a part of the standards)
- Observations on the Standards, Including Significant Provisions that are Missing

HISTORY, DEVELOPMENT, AND CONSENSUS

When ANSI first approved Z10 in 2005, the secretariat was the American Industrial Hygiene Association. Z10 was revised in 2012 and reaffirmed in 2017. A major revision of Z10.0 was approved by ANSI in 2019. Its secretariat is now the American Society of Safety Professionals.

For the 2005 version, as many as 80 safety professionals were involved as committee members, alternates, resources, and interested commenters over a six-year period. They represented industry, labor, government, business associations, professional organizations, academe, and persons of general interest.

Thus, broad participation in the development of and acceptance of the standard was achieved, and the breadth of that participation was significant. A similar structure was maintained for the latter versions. In the 2019 version of Z10.0, about 75 names are listed as participants and members of the committee.

Imagine the variations in opinions that so many individuals would have about what should or should not be contained in a health and safety management system standard. It was not easy to obtain concurrence. In some instances, the leaders had to accept the negative vote on provisions that they thought should be contained in Z10.0.

One of the reasons for the Z10.0 committee's success was its strict adherence to the due diligence requirements applicable to the development of an ANSI standard. There was a balance of stakeholders providing input and open discussion, which resulted in their vetting of each issue raised to a conclusion. In crafting Z10.0, 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.

Similar comments can be made about 45001. Through five years of committee activity, representatives from about 80 countries were involved. Thus, a multiplicity of views was represented. One participant said that she likened the difficulty in arriving at consensus to what she imagined would occur when a treaty was drafted.

It must be recognized that getting ISO to approve an international standard on occupational health and safety management systems is a major accomplishment. Leaders of the activity that resulted in the adoption of 45001 should be congratulated for their accomplishments. Knowing how standard committees work and how difficult it is sometimes to get agreement on a provision, it may be that the standard represents all that could be achieved.

ASSP has recognized the international implications of 45001. It has developed training programs and created a certification mechanism for those organizations that decide that it will be to their advantage to have such certification. That would show

that the health and safety management systems in those organizations are at least equivalent to the provisions of 45001.

A journey into the Internet will reveal that offers of training and certification for 45001 are numerous.

COMPATIBILITY AND HARMONIZATION

One of the goals of the drafters of Z10.0 was to assure that the standard could be easily integrated into whatever management system an organization has in place. As to structure, both standards are compatible and harmonized with the ISO quality and environmental management system standards—the ISO 9000 and ISO 14000 series.

Also, Z10.0 and 45001 are written as generic standards and patterned after the style of the ISO standards. In this context, generic means that the standards can be applied to all:

- organizations of any size or type.
- sectors of activity, whether a business enterprise, a nonprofit service provider, or a government entity.

THE CONTINUAL IMPROVEMENT PROCESS: THE PDCA CONCEPT

Writers of Z10.0 and 45001 say that each standard is built on the well-known Plan–Do–Check–Act (PDCA) process for continual improvement. In Z10's Introduction, on page iii, Figure 1.2 is a depiction of the PDCA concept. It is shown here as Figure 1.2 in Z10.0.

On page iv in Z10.0, Figure 1.3 is a chart pertaining largely to the Clauses in Z10.0. It is a considerable extension of the PDCA concept. It does not retain a PDCA identification. A chart similar to Figure 1.3 is presented at the beginning of each of the standard's major sections.

In 45001, on page viii, Figure 1.4 is titled “Relationship between PDCA and the framework in this document.” That chart does show the PDCA initials. It is not replicated elsewhere in the standard. It is shown here.

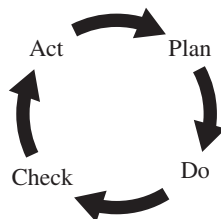


Figure 1.2 Depiction of original Plan–Do–Check–Act system.

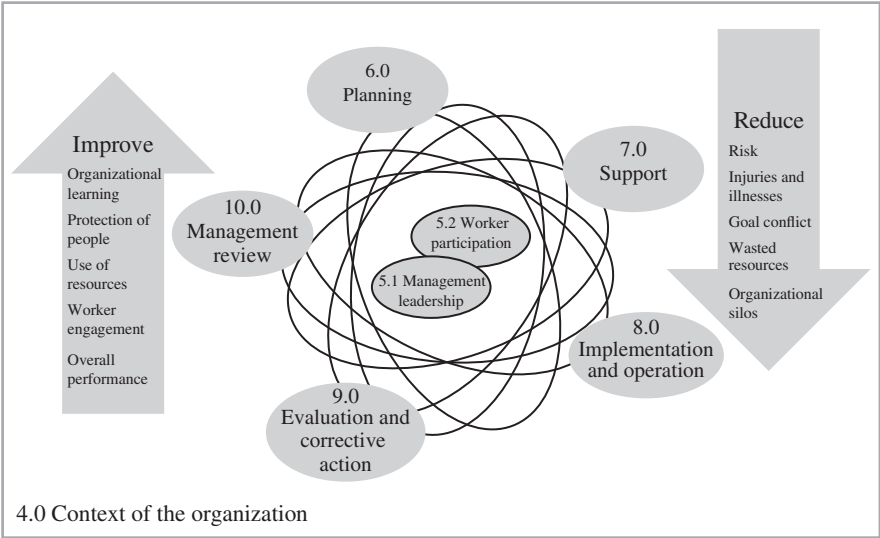
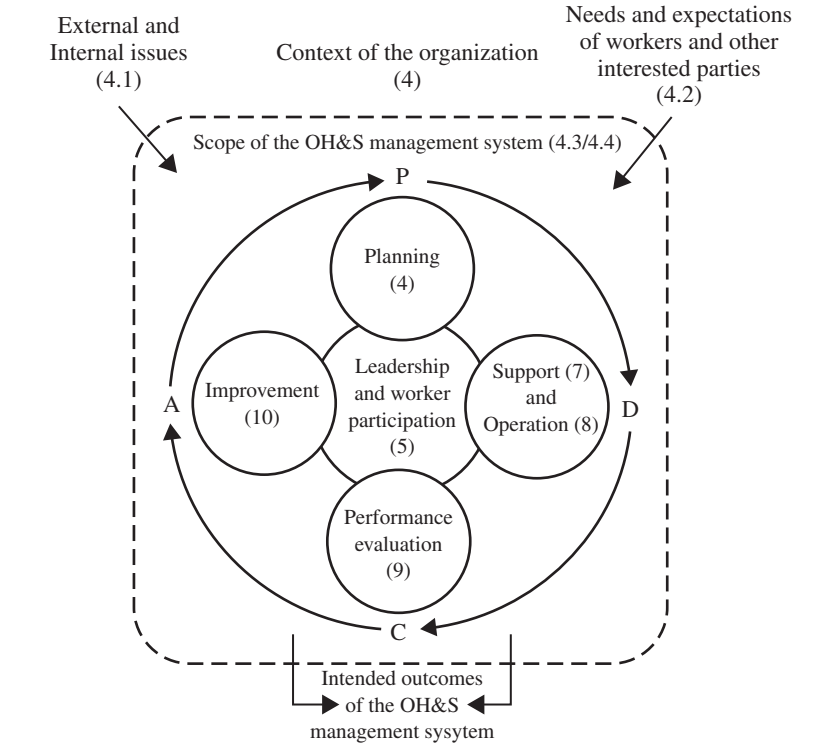


Figure 1.3 Replacement for PDCA as in Z10.0.



Note: The numbers given in brackets refer to the clause numbers in this document.

Figure 1.4 Relationship between PDCA and the framework in this document.

A MAJOR THEME

Throughout Z10.0 and 45001, the following theme is evident. Organizations are to have processes in place to assure that:

- Management is providing direction and leadership.
- Workers are extensively involved.
- Resources are adequate.
- Hazards are identified and evaluated.
- Risks are assessed and prioritized.
- Management system deficiencies and opportunities for improvement are identified.
- Risk elimination, reduction, or control measures are taken.
- Injuries and illnesses are to be reduced.
- There is continuing communication about the status of compliance or noncompliance with the provisions in an organization's health and safety management system so that continual improvement can be made.
- Management constantly reviews for effectiveness.

RELATING THIS MAJOR THEME TO SERIOUS INJURY PREVENTION

A plea is made in Chapter 7 in this book, *Innovations in Serious Injury, Illness, and Fatality Prevention*, for organizations to improve their safety cultures so that a focus on the prevention of serious outcomes is embedded into every aspect of their safety and health management systems.

To accomplish the greatest good with the limited resources available, risks presenting the potential for the most serious harm must be given higher priority for management consideration and action. Accomplishments with respect to the major theme previously cited can serve that purpose.

Z10.0 AND 45001 ARE MANAGEMENT SYSTEM STANDARDS

Both Z10.0 and 45001 outline the overall processes to be put in place to have an effective safety and health management system. They are not specification standards. They are management system standards.

What's the difference between a management system standard and a specification standard? In a management system standard, general process and system guidelines are given for a provision without specifying the details on how the provision is to be carried out. In a specification standard, such details are given.

Item B in Section 7.2 Education, Training and Competence in Z10.0 is repeated here to illustrate the difference.

Section 7.2: Education, Training, and Competence.

The organization shall establish processes to:

B. Ensure through appropriate education, training, or other methods that workers understand applicable OHSMS requirements and their importance and are competent to carry out their responsibilities.

That is the extent of the requirements for Section 7.2-B of Z10.0. If the standard was written as a specific standard, requirements comparable to the following might be extensions of 7.2-B.

- a. At least 12 hours of training shall be given initially to engineers and safety professionals in prevention through design, to be followed annually with a minimum of six hours spent on refresher materials.
- b. All employees shall be given a minimum of six hours training annually in hazard identification.
- c. All employees shall be given at least six hours of training on how they can participate in the health and safety management system.
- d. All employees shall be given a minimum of four hours training annually in the use of personal protective equipment.
- e. 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.

In the Introduction for Z10.0, they say “ANSI/ASSP Z10.0 focuses primarily on the strategic levels of policy and the processes to ensure the policy is effectively carried out. The standard does not provide detailed procedures, job instructions or documentation mechanisms.” (p. iii)

Similarly, 45001 says that “This document does not state specific criteria for OH&S performance, nor is it prescriptive about the design of an OH&S management system.” (p. 1)

FOREWORDS AND INTRODUCTIONS FOR Z10.0 AND 45001

Much of the Forward for Z10.0 substantiates the need for and the value of having occupational health and safety management systems and gives a history of the standard. For 45001, the comments pertain mostly to: meeting ISO requirements; that some of the contents of the standard may be subject to patent rights; and that trade names used does not indicate endorsement.

In the Introduction to 45001, the drafters say that the adoption of the standard provides an organization with the means to provide a workplace in which the occupational health and safety risks can be controlled and injuries and illnesses can be prevented.

Success factors are listed, and the list starts with top management leadership, commitment, responsibilities, and accountability and continues with the goals to be reached by applying the provisions of each of the sections of the standard.

In the Introduction to Z10.0, they say that the purpose of the standard is to provide organizations an effective tool for continual improvement of their occupational health and safety performance. Also, an occupational health and safety management system that is implemented in conformance with this standard can help organizations minimize workplace risks and reduce the occurrence and cost of occupational injuries, illnesses, and fatalities.

WORD USAGE—REQUIREMENTS, RECOMMENDED PRACTICES, PERMISSIONS, AND POSSIBILITIES

As is common in ANSI and international standards, requirements are identified by the word “shall.” An organization that chooses to conform to the standard is expected to fulfill the “shall” requirements; the word “should” pertains to recommended practices; “may” indicates permission; and “can” indicates a possibility or a capability.

COMPOSITES OF INTRODUCTIONS FOR Z10.0 AND 45001

This statement appears in the Introduction to Z10.0 and establishes the aim of an OS&H management system.

The purpose of the standard is to provide organizations an effective tool for continual improvement of their occupational health and safety performance.”
(p. iii)

In the Introduction for 45001, 0.1 is the designation for Background. (p. vi). These are the opening sentences.

An organization is responsible for the occupational health and safety of workers and others who can be affected by its activities. This responsibility includes promoting and protecting their physical and *mental health*.”
(Emphasis added)

Mental health is not defined. It is difficult to fathom how the top management of say a 500-employee organization would interpret the term or what preventive actions would be taken if mental health means more than what have been occupational health exposures.

Still in the Introduction to 45001, comments are made on Success Factors. The following appears (note the word culture):

The level of detail, the complexity, the level of documented information and the resources needed to ensure success of an organization's OH&S will depend on a number of factors, such as: The organization's context (e.g. number of workers, site, geography, culture, legal requirements and other requirements. (p. vii)

At the top of page 27 of the Annex to 45001, there is an explanatory paragraph on culture. An organization's culture can have great influence on the decision making for the operation of an occupational health and safety management system. It would have been beneficial if culture had been defined within the standard and given considerable explanatory and support information.

Chapter 2 in this book is titled "Organizational Culture, Management Leadership, and Worker Participation" and its opening sentences are:

Safety is culture driven. Everything that occurs or doesn't occur that relates to safety is a reflection of an organization's culture.

Nevertheless, the Success factors listed in 45001 cover about a page. They are a good guide for management personnel.

COMPOSITES FOR Z10.0 AND 45001: 1.0 THROUGH 3.0—SCOPE, PURPOSE, AND APPLICATION, REFERENCES, DEFINITIONS, AND TERMS AND CONDITIONS

1.0 Scope, Purpose, & Application in Z10.0: 1. Scope in 45001

Scope This standard defines the requirements for an occupational health and safety (OH&S) management system and gives guidance for its use. Organizations are provided flexibility in how to conform to the requirements of this standard in a manner appropriate to each organization and commensurate with its OH&S risks.

Purpose This standard provides a management tool to achieve the intended purposes of it OH&S management system, improve performance, provide safe workplaces, reduce the risk of occupational injuries, illnesses, and fatalities, achieve continual improvement, and fulfill legal or other requirements.

Application This standard is applicable to organizations of all sizes and types.

2.0 References in Z10.0: 2. Normative References in 45001

Normative references: There are no normative references.

Informative references: There are no informative references.

Composite: 3.0 Definitions in Z10.0: 3. Terms and Definitions in 45001

As is typical in ANSI and ISO standards, definitions are given for some of the terms used in the standard. Safety professionals should become familiar with them. In Z10.0, the definitions are in alphabetical order. In 45001, they are in the order in which they appear in the standard. An alphabetical index of those terms can be found on page 41 of 45001.

In a November 2018 draft of Z10, this was the definition given for **Acceptable Level of Risk**:

A level of risk which can be further lowered by an increase in resource expenditure or decrease in benefit that is disproportionate in relation to the resulting decrease in risk.

Note: This is a typical definition of “as low as reasonably practicable” (ALARP).

This is the definition that the Z10 committee decided upon for the 2019 version of its standard.

Acceptable Level of Risk: The level of risk to workers, resulting from exposure to hazards or system deficiencies, that is tolerated by the organization.

Had the Z10.0 committee decided to accept the November 2018 version, which included reference to ALARP—that would have been progressive.

Although the BSI publication on 18001 includes a definition of acceptable risk, there is no such definition in 45001. That BSI definition is:

Acceptable Risk: risk that has been reduced to a level that can be tolerated by the organization having regard to its legal obligations and its own OH&S policy.

Note the terminology “risk that has been reduced to a level.”

COMPOSITE: 4.0 STRATEGIC CONSIDERATIONS: CONTEXT OF THE ORGANIZATION IN Z10.0: 4. CONTEXT OF THE ORGANIZATION IN 45001

This section of Z10.0 and 45001 is a new addition. It seems to represent a European view that has not been incorporated in ANSI standards as yet. A composite of the requirements follows.

An organization aligns the OH&S management system with the context of the organization by understanding the organization and its context; understanding the needs and expectations of workers and other interested parties; determining the scope of the OHSMS; and determining activities under the organization's control.

To understand the organization and its context: An organization determines the external and internal issues that are relevant to its purpose and vision that affect its ability to achieve the intended outcome(s) of its OH&S management system to provide safe workplaces and to prevent injuries, illnesses, and fatalities.

To understand the needs and expectations of workers and other interested parties: An organization determines the relevant needs and expectations (i.e., requirements) of workers and other interested parties; the other interested parties, in addition to workers, that are relevant to the OHS management system; and which of these needs and expectations are or could become legal requirements and other requirements.

To determine the scope of the OHS management system: An organization identifies the boundaries and applicability of the OH&S management system to establish its scope; assures that its OH&S system includes the activities, products, and services within the organization's control or influence that can impact the organization's OH&S performance.

With respect to the OH&S management system: The organization shall establish, implement, maintain, and continually improve an OH&S management system, including the processes needed and their interactions, in accordance with the requirements of this document.

COMPOSITE: 5.0 MANAGEMENT LEADERSHIP & EMPLOYEE PARTICIPATION IN Z10.0: 5. LEADERSHIP AND WORKER PARTICIPATION IN 45001

In both Z10.0 and 45001, Section 5 represents the most important requirement for a successful health and safety management system. Safety professionals will surely agree that top management leadership and effective employee participation are crucial for success.

Top management leadership is vital because it sets the organization's safety culture and because continual improvement processes cannot be achieved without the provision of adequate resources and sincere top management direction. A composite of key statements in the standards is as follows:

- Top management shall take overall responsibility for worker safety.
- Top management shall direct the organization to establish, implement, and maintain an OH&S.
- Top management shall ensure that the resources needed to have an effective occupational health and management system are provided.
- Top management shall provide the leadership to integrate the OH&S system into the general business practice.
- Top management shall ensure that responsibilities of individuals for implementation of an effective occupational health and safety management system are understood.

- An organization's top management shall establish a documented occupational health and safety policy.
- An organization's top management shall establish a process to ensure effective participation in the OH&S system by its employees at all levels.
- Top management must identify and remove, or reduce obstacles or barriers to participation by workers in the safety management system.

As management provides direction and leadership, assumes responsibility for the OH&S management system, ensures effective employee participation, and creates the organization's culture, the purpose of the standard must be kept in mind—to reduce the risk of occupational injuries, illnesses, and fatalities.

That will be done best if personnel in the organization understand that in the application of every safety and health management process, the outcome is to achieve acceptable risk levels, and that a special focus must be given to identifying the reality of causal factors for incidents that may result in injuries.

In both standards, the provisions for worker participation are extensive and accomplish close to the same purposes. A duplication of the opening sentence in 45001, following **5.4, Consultation and participation of workers**, gives an indication of how extensive are the provisions.

The organization shall establish, implement and maintain a process(es) for consultation and participation of workers at all applicable levels and functions, and, where they exist, workers' representatives, in the development, planning, implementation, performance evaluation and actions for improvement of the OH&S management system.

Additional comments on worker participation are made under the Planning requirements, which follow.

COMPOSITE: 6.0 PLANNING IN Z10.0: 6. PLANNING IN 45001

Planning is the first step in the PDCA process. As would be expected, this section sets forth the planning process to implement the standard and to establish plans for improvement. Planning is an ongoing and recurring process to help identify issues, prioritize them, and implement plans to achieve objectives. In the Definitions for Z10.0, OHSMS Issues are defined as:

Hazards, risks, management system deficiencies, legal requirements and opportunities for improvement (p. 3).

In the continual improvement process, as elements in the standard are applied, information defining opportunities for further improvement in the safety and health management system is to be fed back into the planning process for additional consideration, and for additional risk reduction if feasible.

Reviews are to be made to identify the differences between existing operational safety management systems and the requirements of the standards. Reviews shall include information regarding:

- Relevant business systems and operational processes.
- Operational issues such as, hazards, risks, and controls.
- OH&S opportunities for improvement
- Identification of system deficiencies
- Previously identified OH&S issues.
- Allocation of resources.
- Applicable regulations, standards, and other health and safety requirements.
- Design of the workplace and work methods and how work is organized.
- Hazard identification and analysis.
- Risk assessments and evaluations.
- Process and mechanisms for employee participation.
- Results of audits.
- Legal requirements.
- Other relevant activities.

As was stated previously, both 45001 and Z10.0 require extensive involvement of workers. It is intended that workers be encouraged to

- have meaningful involvement in the structure, operation, and pursuit of the objectives of the occupational risk management system;
- identify tasks, hazards and risks, and possible control measures; and
- participate in planning, evaluation, implementation of control measures for risk reduction.

Chapter 2 in this book is titled Organizational Culture, Management Leadership, and Worker Participation. Worker participation is well covered in that chapter.

In 45001, there is a subsection within the Planning Section titled Hazard identification and assessment of risks and opportunities. To follow the requirements in 45001 under that caption, which leads to risk assessments, an organization shall “Establish, implement and maintain process(es) for hazard identification that is ongoing.” A sampling follows of subjects to be considered for hazard identification.

- how the work is organized.
- design of facilities, equipment, and work areas.
- human factors.
- how the work is performed.
- actual and proposed changes in operations.
- changes in knowledge or information about hazards.

For risk assessment, in 45001, an organization shall establish a process(es) to assess, prioritize, and address its OH&S issues on an ongoing basis to:

- identify potential hazards.
- grade the potential severity of hazards.
- assess the risks which derive from recognized hazards.
- give appropriate consideration to exposure data and frequency of exposure.
- ensure that human behavior potentials are a part of the assessment.
- consider the effectiveness of existing controls.
- establish priorities, considering fatal and serious injury and illness potential.
- identify causal factors.
- establish a process to achieve risk reduction.

In addition, the organization, in its Planning, is to assess operations to seek opportunities for improvement of the OH&S system, such as by revising work methods and eliminating or reducing risks.

Priorities and objectives are to be established for amelioration to achieve the objectives to reduce illnesses and injuries. Implementation plans and allocation of resources should be periodically reviewed and updated as necessary to reflect changes in policies, objectives, activities, products, services, or operating conditions of the organization.

For all of the Planning activity, the organization shall maintain and retain documented information on the OH&S objectives and the plans to achieve them.

In Z10.0, it is said that “Assessments made in this section (the Planning section) are only for the purpose of prioritizing OH&S issues and may not be complete or sufficient to determine hazard controls.”

COMPOSITE: 7.0 SUPPORT IN Z10.0:7. SUPPORT IN 45001

This section on Support is new for Z10.0. Its purpose is to assure that the resources are adequate to establish and maintain an effective occupational safety and health management system. Support includes the necessary human and financial resources, training and education, having competent personnel, effective communication and documentation.

Contents of the two standards in this section are markedly different. For example, the first subsection for 45001 after “Resources” is titled “Competence”. In Z10.0, it is “Education, Training and Competence.”

In 45001, for Competence, an organization is required to assure that workers are competent, that they are able to identify hazards through education, training, or experience, and retain the necessary documentation on competence. In a “Note” (not part of the standard) “Applicable actions can include, for example, the provision of training.”

Training in 45001 is a “can” option for which the definition is to have a “possibility or a capability.” Although the word training appears in several sections of 45001, the standard is short on training.

In Z10.0, under Education, Training and Competence, an organization is to provide for the competence of workers, supervisors, managers, engineers, contractors, etc. and ensure that they are competent through appropriate education, training, and other suitable means.

Training is to be ongoing and timely, and evaluations are to be made to assure that trainers are competent and that training is effective.

In 45001, for Awareness, workers are to be made aware of the occupational health and safety policy, its objectives, their ability to make contributions, incidents and the outcomes of investigations, hazards and risks, and the ability to remove themselves from work situations that present imminent and serious danger to their lives.

Under Communication in 45001, an organization is to determine: what, how, and when there is to be communication; and that information is provided to all who are interested in the organization’s OH&S policy and its requirement for continual improvement.

In Z10.0, Awareness and Communication are treated in one subsection. Content includes pretty much of what is said in 45001, but it is more extensive. Certain provisions are of particular interest. One such provision requires that an organization ensures effective access to, and remove barriers to participation in, education and training. And for that subject, a Note is included that says:

Examples of obstacles or barriers may include illiteracy, language differences reprisals (supervisory and/or peer) or policies, practices or programs that penalize or discourage communication. Incentive programs, drug testing programs, and disciplinary mechanisms, should be carefully designed and implemented to ensure workers are not discouraged from reporting job-related injuries, illnesses, hazards, and risks.

They say in Z10.0 that an organization should communicate on relevant changes to be made or are being made **to all levels** that would be affected. (Emphasis added). They also say that “communication should be tailored to the audience; and clear and timely communications about issues related to the OH&S is a key success factor.”

General comments follow reflecting contents of both standards. They pertain to what should be considered when developing communications and the communication process.

- results of OH&S performance such as progress towards established metrics, lessons learned from incident investigations, findings from OH&S assessments, and outcomes from management reviews.
- results of monitoring and measurements to affected parties.
- effective means for obtaining and responding to worker input on OH&S issues.
- what level of understanding has been achieved of the OH&S system, hazards, and risks at various levels of the organization.

- external parties including visitors, neighbors, emergency services, insurers, and regulatory agencies.

COMPOSITE: 8.0 IMPLEMENTATION AND OPERATION IN Z10.0: 8. OPERATION IN 45001

This section defines the operational elements that are required for implementation of an effective OH&S management system. These elements provide the backbone of an OHSMS and the means to pursue the objectives from the planning system.

For both standards, general requirements are that an organization shall plan, implement, control, and maintain the processes needed to meet the requirements of this occupational health and safety management system. Examples of operational control of the processes include the following:

- use of procedures and systems of work.
- ensuring the competence of workers.
- establishing specifications for the procurement of goods and services.
- application of legal and/or manufacturers' instructions for equipment use.
- engineering and administrative controls.
- adapting work to workers.

Whenever practical, the operational elements should be integrated into existing business processes and systems.

Additional comments made here on hazard identification and risk assessment and control pertain to the content of Z10.0. Recall that hazard identification and risk assessment were covered in the Planning section of 45001. Some of the material here may be considered duplicators.

Identification of Hazards

An organization shall establish a process to identify hazards on an ongoing basis. Hazard identification processes should include, but not be limited to

- how work is organized.
- social factors (including workload, work hours, victimization, harassment, bullying, and isolation).
- leadership.
- organizational culture.
- routine and nonroutine activities and situations.
- human factor error potential.
- how work is performed.
- design of the work place.

- changes in knowledge of, and information about, hazards.
- high-risk operations, jobs, activities and tasks.
- potential for severity of injury or illness.
- incident and illness trends.
- occupational health exposure assessments.

Risk Assessment

An organization shall establish a process to assess, prioritize, and address risks on an ongoing basis. During the risk assessment process, routine and nonroutine activities should be considered, including hazards arising from:

- infrastructure, equipment, materials, substances, and the physical conditions of the workplace.
- product and service design, research, development, testing, production, assembly, construction, service delivery, maintenance, and disposal.
- human factors (includes ergonomics).
- how the work is performed.
- past relevant incidents, internal and external to the organization.

Incorporating occupational health and safety into the tools used by the business to operate leads to increased ownership by all members of the organization. OH&S should be a normal, integrated part of the overall operation of the business. Risk assessment processes should include, but not be limited to

- considering OH&S in the procurement process helps to keep hazards from being introduced into the workplace and can be part of the continuity of the supply chain.
- observing OH&S behaviors and condition as part walkthroughs of the operations helps to associate it with the “way business is done.”
- including OH&S as an element of the maintenance program allows for rapid mitigation of hazards and opportunities to eliminate risks during preventative maintenance.
- when OH&S uses the same process to identify and track non-conformances as quality, manufacturing, and other parts of the organization, they get increased visibility and access to resources.
- adding OH&S to process improvement activities will further reinforce its importance and serves to better integrate it into the business.

Management system deficiencies may be found during hazards identification and when making risk assessments. What is important when such deficiencies are recognized is that improvement actions are taken. System deficiencies include resources, personnel, policies, practices, poor top management engagement, cultural issues, and condoning unacceptable risks.

8.4 HIERARCHY OF CONTROLS IN Z10.0: 8.1 ELIMINATING HAZARDS AND REDUCING OH&S RISKS IN 45001

In 45001, an organization shall establish, implement, and maintain a process to eliminate or reduce risks using the following hierarchy of controls.

- elimination.
- substitute with less hazardous processes, operations, or equipment.
- use engineering controls and reorganization of work.
- use administrative controls, including training.
- use adequate personal protective equipment.

While the same general direction is given in Z10.0—an organization shall establish a process for achieving an acceptable level of risk reduction based upon the following preferred order of controls—the “preferred order of controls” is duplicated here because it adds “Warnings” to the hierarchy.

- Elimination,
- Substitution of less hazardous materials, processes, operations, or equipment,
- Engineering controls,
- Warnings,
- Administrative controls, and
- Personal protective equipment.

When controlling a hazard, the organization should first consider methods to eliminate the hazard or substitute a less hazardous method or process. This is best accomplished in the concept and design phases for any new project or alteration.

If this is not feasible, engineering controls such as machine guards and ventilation systems should be the next approach. This process continues down the hierarchy until the highest level feasible control is found.

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

Warning system effectiveness and the effectiveness of instructions, signs, and warning labels rely considerably on administrative controls, such as training, drills, the quality of maintenance, and the reaction capabilities of people. Further, although vital in many situations, warning systems may be reactionary in that they alert persons only after a hazard’s potential is in the process of being realized (e.g., a smoke alarm).

Comment is necessary on this author’s preferred use of the term “warning systems” over warnings or warning signs. The terms warnings and warning signs appear in some published hierarchies of control—as is the case in Z10.0. The

entirety of the needs of a warning system must be considered, for which warning signs or warning devices alone may be inadequate. For example, the NFPA Life Safety Code 101 may require, among other things:

- detectors for smoke and products of combustion;
- automatic and manual audible and visible alarms;
- lighted exit signs;
- designated, alternate, properly lit exit paths;
- adequate spacing for personnel at the end of the exit path;
- proper hardware for doors; and
- emergency power systems

Obviously, much more verbiage than “Warnings” is needed in a hierarchy of controls.

Administrative controls include training, job planning, rotating and scheduling, changes to work procedures, implementation of work area protection (e.g., temporary barricades), and similar measures.

In 45001, there is a note following the hierarchy of controls which says that in some countries, legal requirements and other requirements say that personal protective equipment be provided at no cost to workers.

In Z10.0, the only mention of personal protective equipment is in a part of a sentence (Note 1) that says “lower order controls, (e.g., warnings, administrative controls, or personal protective equipment) are used to complement engineering controls to reduce risks to an acceptable level.”

In Chapter 11—Hierarchies of Control—in this book, it is said that:

Although the use of personal protective equipment is common and necessary in many occupational situations, it is the least effective method to deal with hazards and risks.

Systems put in place for their use can easily be defeated. In the design process, one of the goals should be to reduce reliance on personal protective equipment to as low as reasonably practicable.

8.5 DESIGN REVIEW AND MANAGEMENT OF CHANGE IN Z10.0:

8.1.3. MANAGEMENT OF CHANGE IN 45001

In 45001, the comparable section is captioned Management of Change, only. There is no particularly identified section in 45001 for design review, although design is mentioned in several sections.

Requirements in Z10.0 are that an organization shall establish a process(es) to identify and take appropriate steps to prevent or otherwise control hazards at the design and redesign stages and when changes are made. The purpose of the process(es) is to avoid bringing new hazards and risks into the work environment, and thereby prevent the occurrence of injuries and illnesses.

Consideration of hazards and risks should continue as the design is detailed and then comes into operation. Consideration must be ongoing during full life cycles to reflect current, changing, and future activities.

Processes instituted by organizations for design and redesign activities and for management of change shall include:

- identification of tasks and related health and safety hazards.
- recognition of hazards associated with human factors including human errors that are provoked by design deficiencies.
- review of applicable regulations, codes, standards, internal and external recognized guidelines.
- application of control measures (hierarchy of controls).
- determination of the appropriate scope and degree of the design review and management of change.
- employee participation.

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

- new or modified technology (including software), equipment or facilities.
- new or revised procedures, work practices, and design specifications.
- 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.
- new health and safety standards or regulations.

Small improvement events can fall outside the scope of the formal design review and management of change processes. This may result in hazards being brought into the workplace. It is critical that OH&S considerations be included in rapid improvement events and that risk assessments be conducted at the conclusion of small improvement events.

In 45001, the first instruction given for **Management of change** is that an organization shall establish a process(es) for the implementation and control of planned temporary and permanent changes that impact OH&S performance, including:

- a. new products, services and processes, or changes to existing products, services and processes, including—work place locations and surroundings; work organization; working conditions; equipment; the work force.
- b. changes to legal requirements and other requirements.
- c. changes in knowledge or information about hazards and OH&S risks.
- d. developments in knowledge and technology.

It also says in 45001 that an organization shall review the consequences of unintended changes, taking action to mitigate any adverse effects, as necessary.

Applicable Life Cycle Phases—Z10.0 Only

During the design review and management of change processes, all applicable life cycle phases shall be taken into consideration.

Note: An effective design review considers all aspects including design, procurement, construction, operation, maintenance, and decommissioning. The life cycle phases should integrate quality, health and safety, production, procurement, and consider potential impacts.

Process Verification in Z10.0 Only

A provision for process verification exists only in Z10.0. This is a composite of the Z10.0 requirement.

Periodic assessments by internal and external professionals (same organization, different location or true externals) can often identify system deficiencies that could lead to OH&S risks and help to control them. Business reviews can also provide insight into the creation of risks, allowing management to proactively control them and to enhance operational excellence, sustainability and reliability.

Procurement

Although the requirements for procurement in 45001 and Z10.0 are plainly stated and easily understood, they are brief in relation to the enormity of what will be required to implement them. This is a composite of how the two standards read.

Organizations shall establish, implement and maintain processes to control the procurement of products and services to ensure that they conform with their occupational health and safety management systems.

It is important that the procurement methods not focus solely on financial or operational considerations, but instead embed occupational health and safety considerations in the same business processes for contractor selection, award and future approvals.

Acquiring procurement specifications pertaining to safety is not easy to do. They are considered proprietary by many companies. In addition to considering quality, financial, manufacturing, and cost, some companies do include OH&S as part of the process of supplier qualification.

Getting these procurement provisions established presents a huge challenge for safety professionals, but the benefits can be immense.

Contractors

This is a composite of what is said in 45001 and Z10.0 under Contractors: The organization shall coordinate its procurement process(es) with its contractors, to identify hazards and to assess and control the OH&S risks arising from:

- a. the contractors' activities and operations that impact the organization.
- b. the organization's activities and operations that impact the contractor's workers.
- c. the contractor's activities and operations that impact other interested parties in the workplace.

Organizations are also to assure that its occupational health and safety management system is adhered to by contractors. It is important to recognize that contractors can create risks not only to themselves but also to the contracting organization.

It is therefore critical that an effective program for managing contractor OH&S be in place prior to beginning the work. Working with Procurement personnel to make OH&S requirements part of the contract agreement establishes a link to an important part of the organization.

Occupational Health

In the Background for 45001, they say that "An organization is responsible for the occupational health and safety of workers and others who can be affected by its activities." (0.1—p. 6). And the term OH&S is used throughout the standard. But there is no separate section for Occupational Health in 45001.

All that follows on occupational health pertains to Z10.0, and it is extensive. A few excerpts follow:

An organization shall establish an occupational health (OH) process(es) to protect the health of workers, including the following:

- anticipation, recognition, evaluation, control, and confirmation (that the control is working and effective) for chemical, physical, and biological agents, and ergonomic and psychosocial stressors that can adversely affect the health of workers.
- prevention, early detection, diagnosis, and treatment of work-related injuries and illnesses, including emergency care.
- recognition and reasonable accommodation for both work-related and non-work-related, medical conditions that may affect workers' abilities to perform their jobs safely and productively.
- integration with other aspects of this management system to ensure occupational health risk issues are addressed.

Outsourcing

This subject appears only in 45001. They say that organizations shall have outsourced functions and processes under control, that they meet legal requirements, and that they achieve the intended outcomes of the OH&S management system.

EMERGENCY PREPAREDNESS IN Z10.0: EMERGENCY PREPAREDNESS AND RESPONSE IN 45001

To meet the requirements of this provision, an organization is to have management systems in place to identify, prevent, prepare for, and/or respond to emergencies. A composite of requirements in both standards follows. Processes are to

- comply with legal and other requirements.
- schedule adequate training and retraining for all members at all levels of the organization.
- have provisions to periodically test the emergency response system through drills and to evaluate its performance.
- assure that sufficient emergency response resources are available, e.g., medical rescue, crisis response, law enforcement, fire departments, etc.
- contain the necessary information, internal communication, and coordination to protect all people, including contractors and visitors, in the event of an emergency.
- have provisions to inform and communicate with all workers, contractors, and visitors, as well as with the relevant authorities, the neighboring community, and emergency response and medical services.

9.0 EVALUATION AND CORRECTIVE ACTION IN Z10.0: 9. PERFORMANCE EVALUATION IN 45001

Generally, this Clause in both standards outlines the requirements for processes to evaluate the performance of a health and safety management system. Z10.0 includes requirements for taking corrective action when shortcomings are found. In 45001, the comparable requirements are in Clause 10—Improvement.

Monitoring, Measurement, Analysis and Performance Evaluation in 45001: Monitoring, Measurement, and Assessment in Z10.0

This section of 45001 opens with a statement indicating that an organization shall determine what needs to be measured in relation to

- legal requirements;
- its health and safety provisions;

- progress made; and
- effectiveness of its controls.

It is also required that an organization determines the methods to be used in the required processes and when the data is to be analyzed.

In Z10.0, they say that measures of performance may include various indicators for system effectiveness. Examples of system elements may include the following:

- management leadership.
- worker participation.
- measurement of progress toward achieving objectives and targets.
- support provided.
- quality of hazard identification and control.
- quality and completeness of risk assessment and risk reduction activities.
- indicators from occupational health risk assessment and risk indicators.
- occupational injury and illness rates.
- workplace inspections and testing.

For both standards—using the data developed, the organization is to evaluate its health and safety performance, communicate on the results, and take the actions necessary for improvement in the processes. Proper documentation is to be retained.

In 45001, a subsection titled Evaluation of compliance follows the subsection on Monitoring, measurement, analysis, and performance evaluation. Its opening statement indicates that an organization shall have processes in place to assure that legal and other requirements are met.

Incident Investigation

Although incident investigation is the next subject addressed in Z10.0, comments on this subject are not made in 45001 until the requirements for Clause 10—Improvement—are defined.

Requirements in Z10.0 are that an organization establishes a process to report, investigate, analyze, document, and communicate on incidents to learn from the event, improve the management system, and address OHSMS nonconformances and other factors that may be causing or contributing to the occurrence of incidents. Investigations shall be performed by personnel demonstrating competence in investigation procedures, conducted in a timely manner and include worker participation.

Incident investigation processes should define what needs to be investigated and when, who should participate, and how recommendations to prevent recurrence should be generated and communicated. For incidents to be investigated, they must be reported. Organizations should have all barriers to incident reporting removed.

They say that findings from incident investigations should be used for developing and implementing corrective action plans. Lessons learned from these investigations can then be fed into the planning or corrective action processes.

It should be understood that incidents may be symptoms of deficiencies in the occupational health and safety management system. If the ideal could be reached, hazards and their underlying system deficiencies would be identified before any injury or illness occurs.

They say in Annex A for Z10.0, at E9.2, that “Many techniques are available for incident investigation. Only a few of the tools used in business management systems are mentioned here:

- The Five Why Problem Solving Technique.
- Fishbone Analysis.
- Critical Incident Technique or CIT.
- 8D Analysis.
- FMEA – Failure Mode and Effects Analysis.
- Bow-tie Analysis.
- CAST – Causal Analysis using Systems Theory.”

Where appropriate, the investigation process used to identify causal factors for incidents should be the same as the organization uses for incidents that occur in other disciplines.

Understanding the gap between work as imagined and work-as-done helps in an incident investigation. A just culture is needed to insure that workers feel secure when they disclose how work is actually performed.

Incident investigation is the subject addressed in Chapter 19 in this book.

Audits in Z10.0: Internal Audits in 45001

A summation of what is said in both standards about audits is given here. An organization shall:

- define the criteria for audits.
- achieve an understanding that audits are management system audits rather than compliance audits.
- include management shortcomings with respect to relative legal requirements.
- have audits made periodically with respect to application of the provisions in the occupational health and safety management system.
- ensure that audits are made by competent persons not attached to the location being audited (but those persons can be in the same organization).
- have auditors communicate immediately on potentials for serious injuries, illnesses, or fatalities so that swift corrective action can be taken.
- document and communicate the results.
- have management action taken on deficiencies mentioned in audit reports.

Audits are to measure the organization's effectiveness in implementing the elements of the occupational health and safety management system. An expanded treatise on audits is presented in this book in Chapter 18, Audit Requirements.

Corrective Action

For Z10.0, this section defines requirements for processes to take corrective action when nonconformances, system deficiencies, hazards, and incidents that are not being controlled to an acceptable level of risk are found. Processes are to be in place that:

- identify and address new and residual risks associated with corrective actions that are not being controlled to an acceptable level of risk;
- expedite action on high-risk hazards that could result in fatality or serious injury/illness (FSII) that are not being controlled to an acceptable level of risk;
- account for worker participation; and
- review and ensure effectiveness of corrective actions taken.

In Note 1, organizations are informed that they are to address all identified system deficiencies and inadequately controlled hazards through the corrective action process, regardless of how those deficiencies and hazards were identified.

In Note 2, organizations are advised that:

- while risks cannot typically be eliminated entirely, they can be substantially reduced through application of the hierarchy of controls;
- they are to assure that the residual risks are acceptable, which are defined as the remaining risk after controls have been implemented.

Organizations should utilize common business processes to get corrective actions taken because that will be more effective. An example given is to use an existing maintenance work order system.

This standard, Z10.0, also says that involvement of other parts of the organization, such as engineering, procurement, maintenance, and R&D to correct occupational health and safety issues will foster relationships that will support the integration of OSH into the business.

It is also said that when corrective actions for an identified hazard will require a significant period of time to implement, immediate interim corrective action should be taken. They say that expedited actions should consider eliminating the exposure by removing the persons at risk, discontinuing the operation, or reducing the risk.

Management Review in 45001

In 45001, management review is a subset of Performance Evaluation. Reviews shall include consideration of:

- the status of open items from previous reviews.
- audit results.
- input from workers.
- risks and opportunities that should be discussed.
- changes in external and internal issues that are relevant to the occupational health and management system.
- extent to which the OH&S policy and objectives have been met.
- trending of performance.
- notable incidents that have occurred since the previous review.
- opportunities for continual improvement.

Outputs from management reviews shall include all the actions to be taken to reduce risk and for continual improvement.

10. MANAGEMENT REVIEW IN Z10.0: 10. IMPROVEMENT IN 45001

Just previously in this chapter, a summary was given of the requirements for Management Review as in 45001. Comments immediately following here pertain to the provisions for management reviews in Z10.0. They are similar to what was written for management reviews in 45001, and different.

Requirements for the Improvement category in 45001 have substantially different purposes, as will be seen later in this chapter.

Management Reviews as in Z10.0

They say in Z10.0 that management reviews should evaluate how well the occupational health and management system is fulfilling its purposes and how well it is integrated with other business systems. Reviews by top management are required because management has the authority to make the necessary decisions about actions to be taken and resources to be allocated.

To be effective, the review process should ensure that the necessary information is available for top management to evaluate the effectiveness and adequacy of the OHSMS. Management reviews should consider:

- the results of investigations of injuries and illnesses;
- performance monitoring and measurement; audit activities, and
- other relevant data such as the degree to which OHSMS is integrated into the business.

Results of management reviews should be summarized, specifying top management commitments and directives, as well as action items. Action items should designate the individuals responsible for activities and completion target dates.

As with action items from other parts of the business, the status of OHSMS management review action items should be periodically reported to top management until they are completed. Where applicable, using the same processes used in other parts of the business will support the integration of OH&S.

Improvement as in 45001

Immediately after a general statement about Improvement in 45001 indicating that an organization shall determine opportunities to improve its OH&S management system, there is a subsection titled **Incident, nonconformity, and corrective action**. Incidents are joined together with nonconformity.

When an incident or nonconformity occurs, the organization shall have processes in place to:

- react in a timely manner;
- take control and correcting action; and
- deal with the consequences.

With the participation of workers and other interested parties, the incident or nonconformity is to be investigated to determine its causes and whether similar incidents have occurred previously. As appropriate:

- existing assessments of risks are to be reviewed;
- additional action is to be taken if needed;
- risks that particularly relate to the incident are to be assessed;
- effectiveness of corrective actions is to be evaluated; and
- changes are to be made to the OH&S system.

Communication and documentation on the incident or nonconformity is to be appropriate in relation to the nature of the occurrence.

In 45001, there is another subsection to **Improvement** titled **Continual Improvement**. Requirements are that an organization is to continually improve its OH&S system by:

- enhancing performance;
- promoting a supporting culture;
- encouraging participation by workers;
- communicating on continual improvement; and
- doing the proper documentation.

This author finds “promoting a supporting culture” to be of particular interest. Chapter 2 in this book is titled **Organizational Culture, Management Leadership, and Worker Participation**.

ANNEXES, BIBLIOGRAPHIES, AND GUIDANCE MANUALS (NOT A PART OF THE STANDARDS)

Annex A in Z10.0 provides considerable explanatory and advisory text on the following subjects.

- Scope, Purpose, and Application.
- Context of the Organization: Strategic Considerations.
- Management Leadership and Worker Participation.
- Planning.
- Support.
- Implementation and Operation.
- Evaluation and Corrective Action.
- Management Review.

Annex B in Z10.0 is a Bibliography that consists of references pertaining to the subjects in the standard. It runs many pages.

Annex A in 45001 is titled “Guidance on the use of this document.” It is the only annex. It gives guidance on all of the sections and subsections in the standard.

In the Bibliography for 45001, there is a list of 10 ISO standards, 2 ILO Guidelines, 2 publications pertaining to OHSAS 18001 and 18002, and IEC publication (International Electrotechnical Commission).

It is expected that the Z10.0 committee will have a Guidance Manual available consisting of chapters on each of the main sections of the standard.

For OHSAS 18001:2007, the British Standards Institute produced OHSAS 18002:2008, *Occupational health and safety management systems—Guidelines for the implementation of OHSAS18001: 2007*. Quite probably, a similar document will be produced by BSI for 45001.

OBSERVATIONS ON THE STANDARDS, INCLUDING SIGNIFICANT PROVISIONS THAT ARE MISSING

Mental Health

Mention was made earlier in this chapter that a requirement in 45001 indicates that organizations are responsible for a worker’s mental health, a subject not defined. Placing a responsibility on management to protect the mental health of workers is unusual of itself. Perhaps the requirement is unachievable and quite probably unmeasurable by safety practitioners.

If management is to have that responsibility, the standard should have defined the term, provided guidance on how to achieve it and how to know that it is being achieved.

Safety practitioners—take care. How does one determine if an organization is protecting the mental health of workers, not knowing what is expected?

This requirement is also a problem for certifying auditors who would attest that a safety and health management system in place meets the requirements of 45001.

Design Review and Management of Change

These are the Design Review and Management of Change requirements in Z10.0 at Section 8.5.

The organization shall establish a process to identify and take appropriate steps to prevent or otherwise control hazards at the design and redesign stages, and for situations requiring Management of Change, to reduce potential risks to an acceptable level. The process for design and redesign and management of change shall include:

- A. Identification of tasks and related health and safety hazards;
- B. Recognition of hazards associated with human factors, including ergonomics, human errors induced by the design or design deficiencies and where design makes successful job completion unnecessarily difficult;
- C. Review of applicable regulations, codes, standards, internal, and external recognized guidelines;
- D. Application of control measures (hierarchy of controls—Section 8.4);
- E. A determination of the appropriate scope and degree of the design review and management of change; and
- F. Worker participation.

Design requirements are extensive in Z10.0. They recognize that the most effective and economical method to avoid, eliminate, or control hazards and their accompanying risks is to address them in the design and redesign processes.

In 45001, the comparable section is titled “Management of change” only. Although the word design appears in several places in 45001, the standard is considerably short on requirements for preventing or otherwise controlling hazards at the design and redesign stages.

Having said that, the reader is asked to hold judgment until the comments that follow under “Annex A(Informative) in 45001” are read.

Training

In Z10.0, under Education, Training and Competence, an organization is to provide for the competence of workers, supervisors, managers, engineers, contractors, etc. and ensure that they are competent through appropriate education, training, and other suitable means.

Training is to be ongoing and timely, and evaluations are to be made to assure that trainers are competent and that training is effective. Training requirements in Z10.0 are extensive.

In 45001, for Competence, an organization is required to assure that: workers are competent; that they are able to identify hazards through education, training or experience; and retain the necessary documentation on competence. There is no major section in 45001 that includes the word training. Although the word training appears in several sections of 45001, the standard is inadequate on training. This author, because of his experience, believes that training is a vital element within an operational risk management system.

For a reference on the proper place and guidance that should be given to training, see the *Recommended Practices for Safety and Health Programs* issued by OSHA in October 2016. Education and Training is a major section in the *Recommended Practices*.

Occupational Health

In the Background data for 45001, they say that “An organization is responsible for the occupational health and safety of workers and others who can be affected by its activities.” (0.1). And the term OH&S is used throughout the standard. But there is no separate section for Occupational Health in 45001.

Occupational Health requirements in Z10.0 are broadly stated, fit an important need, and give good guidance. Writers of 45001 could say that their standard is all-inclusive and that recognizing the health requirements specifically is unnecessary.

Nevertheless, on this subject, 45001 is inadequate. It is easy to ignore the health exposures, which is too often the case.

Annex A (Informative) in 45001

There is one Annex in 45001. It briefly provides guidance on application of the standard’s provisions. All major captions in the Annex are prefaced by the letter A.

With respect to the several excerpts from Annex A cited here, this question is asked:

Could it be that leaders in the development of 45001 were aware that other elements should have been included in a current occupational risk management standard but could not get agreement on those additional provisions?

Provision A.6.1.2.1 is titled Hazard identification. Terminology following that caption is very close to the wording in the *Prevention through Design* standard, the designation for which is ANSI/ASSE Z590.3-2011 (R2016). This is an excerpt from A.6.1.2.1.

The ongoing proactive identification of hazard begins at the conceptual design stage of any new workplace, facility, product or organization. It

should continue as the design is detailed and then comes into operation, as well as being ongoing during its full life cycle to reflect current, changing and future activities.

Supportive wording is included in A.6.1. Item (f) pertains to opportunities to improve OH&S performance. One of the examples given follows.

Integrating occupational health and safety requirements at the earliest stage in the life cycle of facilities, equipment or process planning for facilities relocation, process re-design or replacement of machinery and plant.

That is good guidance. Terminology in Annex A implies that those who adopt 45001 should apply prevention through design concepts. It would have been appropriate for such provisions to be included in the standard.

Had that been done and expanded, 45001 would not have been short on design, as was previously noted.

Subjects Pertaining to Both 45001 and Z10.0

A.8 in 45001 pertains to Operations. A General Statement on Operations is provided at A.8.1. It follows.

Operational planning and control of the processes need to be established and implemented as necessary to enhance occupational health and safety, by eliminating hazards or, if not practicable, by reducing the OH&S risks to levels as low as reasonably practicable for operational areas and activities.

ALARP is the well-known acronym for “as low as reasonably practicable.” Important guidance would have been provided for users of 45001 and Z10.0 if the requirements implied by ALARP were included in the standards.

A.8.1 also provides examples of operational controls. Item (c) says “establishing preventive or predictive maintenance and inspection programmes.” Having effective inspection programs provide several advantages.

There is no inspection provision in 45001 or in Z10.0. (For an example of an inspection provision, see the previously mentioned *Recommended Practices for Safety and Health Programs* issued by OSHA in October 2016.)

Preventive or predictive maintenance is vital for effective occupational risk management. Having effective maintenance programs are required to assure operational integrity. **There is no preventive maintenance provision in 45001 or Z10.0.**

It is of interest that OSHA’s Voluntary Protection Program (VPP) includes requirements for periodic inspections and for maintenance activities.

CONCLUSION

This chapter presents an overview of 45001 and Z10.0 only. It is to advise briefly on the contents of the standards. Additional chapters follow on selected subjects for which only brief comments are made here.

REFERENCES

- ANSI/ASSP Z10.0-2019. *Occupational Health and Safety Management Systems*. Park Ridge, IL: American Society of Safety Professionals, 2019.
- ANSI/ASSP/ISO 45001-2018. *Occupational Health and Safety Management Systems—Requirements with Guidance for Use*. Park Ridge, IL: American Society of Safety Professionals, 2018.
- ISO 14001:2015. *Environmental Management Systems—Requirements with Guidance for Use*. Geneva, Switzerland: International Organization for Standardization, 2015.
- OHSAS 18001:2007. *Occupational Health and Safety Management Systems—Requirements*. London, UK: British Standards Institution (BSI), 2007.
- OHSAS 18002:2008. *Occupational Health and Safety Management Systems—Guidelines for the Implementation of OHSAS 18001*. London, UK: British Standards Institution (BSI), 2008.
- OSHA. *Recommended Practices for Safety and Health Programs*. Washington, D.C.: OSHA, October 2016. Available at <https://www.osha.gov/shpguidelines/>. Accessed May 31, 2019.

FURTHER READING

- ANSI/ISO/ASQ Q9001-2015. *American National Standard: Quality Management Systems—Requirements*. Milwaukee, WI: American Society for Quality, 2000.
- ISO – Comments on 45001. Available at <https://www.iso.org/iso-45001-occupational-health-and-safety.html>. Accessed May 31, 2019. n.d.
- OSHA’s VPP Site-Based Participation Evaluation Report. Available at http://www.osha.gov/dcsp/vpp/vpp_report/site_based.html. Accessed May 31, 2019. n.d.