AMERICAN NATIONAL STANDARD

ANSI/ASSE Z10-2012 (R2017)
Occupational Health and Safety Management Systems

AMERICAN SOCIETY OF SAFETY ENGINEERS

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American National Standard

Occupational Health and Safety Management Systems

Secretariat

American Society of Safety Engineers
520 N. Northwest Highway
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American National Standard

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Foreword

Quality, environmental, and occupational health and safety (OHS) management systems are used by many organizations in the U.S. and around the world. Quality and environmental systems are frequently in conformance to international voluntary consensus standards, or they share many basic concepts and principles with them. The development of international OHS standards and guidelines is a more recent phenomenon. Many organizations operate their own occupational health and safety management systems (OHSMS), while others use systems that conform to available guidelines. Until the development of this voluntary consensus standard, there was no U.S. OHSMS consensus standard.

There is widespread agreement that the use of management systems can improve organizational performance, including performance in the occupational health and safety arena. The Occupational Safety and Health Administration's (OSHA) Voluntary Protection Program (VPP) relies on management system principles and has reported success in improving occupational health and safety performance among participating companies. In addition, the American Chemistry Council (ACC) reports success in improving environmental performance of participating organizations. The major professional health and safety organizations are also on record in support of management systems as effective tools for improving health and safety performance, as well as for contributing to the overall success of the business. Finally, the fact that many organizations in the U.S. and abroad are implementing management systems in occupational health and safety is evidence that these systems add value to their businesses.

In 1999, the American National Standards Institute officially approved the ANSI Accredited Standards Committee Z10, with the American Industrial Hygiene Association as its Secretariat, to begin work on a U.S. standard. A committee was formed with broadly representative members from industry, labor, government, professional organizations and general interest participants. The committee examined current national and international standards, guidelines and practices in the occupational, environmental and quality systems arenas. Based on extensive deliberations, they adapted the principles most relevant from these approaches into a standard that is compatible with the principal international standards as well as with management system approaches currently in use in the U.S. The process of developing and issuing a national consensus standard is expected to encourage the use of management system principles and guidelines for occupational health and safety among American organizations. It may also yield widespread benefits in health and safety, as well as in productivity, financial performance, quality and other business goals.

Note: The standard was originally approved in 2005, revised in 2012, and reaffirmed in 2017. The standard was originally titled ANSI/AIHA Z10. However, the American Industrial Hygiene Association relinquished the Z10 Committee to ASSE along with the copyright to the Z10 Standard in May of 2012. The acronym "ASSE" has been substituted for the acronym "AIHA®" in several places in the standard to identify the correct secretariat and copyright holder. None of the technical requirements of the standard have been changed since this is a reaffirmation of the 2012 standard.

Introduction

This is a voluntary consensus standard on occupational health and safety management systems. It uses recognized management system principles in order to be compatible with quality and environmental management system standards such as the ISO 9000 and ISO 14000 series. The standard also draws from approaches used by the International Labor Organization's (ILO) guidelines on Occupational Health and Safety Management Systems and from systems in use in organizations in the U.S.

The design of ANSI Z10 encourages integration with other management systems to facilitate organizational effectiveness using the elements of Plan-Do-Check-Act (PDCA) model as the basis for continual improvement. PDCA was popularized by Dr. W. Edwards Deming, and is used as a framework by most management system standards.

While the scope of ANSI Z10 covers occupational health and safety, it can also be used to support other initiatives such as social responsibility and sustainability. Sustainable growth encourages organizations to continually improve all facets of their business. The adoption of Z10 fits well with organizations desiring long-term sustainable growth in a socially responsible manner by reducing injury and illness and improving overall employee well-being.

The purpose of the standard is to provide organizations an effective tool for continual improvement of their occupational health and safety performance. An OHSMS implemented in conformance with this standard can help organizations minimize workplace risks and reduce the occurrence and cost of occupational injuries, illnesses and fatalities. Some

organizations already have developed an effective OHSMS appropriate to their needs but may not conform precisely to this standard. In those instances, the standard may serve as a voluntary tool to identify possible opportunities to improve their systems. Each organization electing to conform to this standard will determine how it will evaluate its conformance to the standard.

Management systems typically include multiple levels of implementation, an example of which is shown in Figure 1.

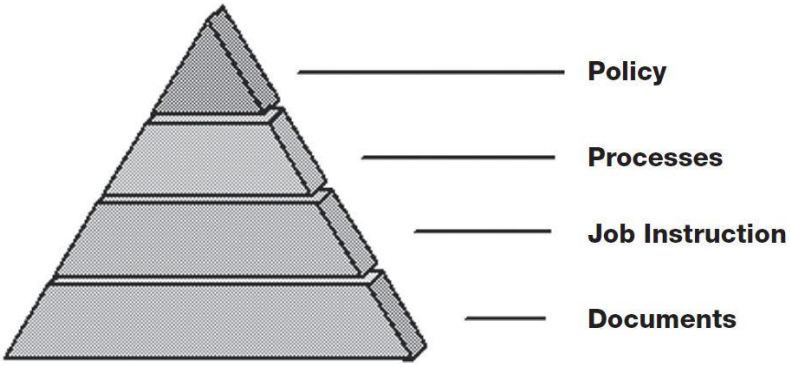

Figure 1-Layers of Management System Implementation

ANSI/ASSE Z10 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. Each organization must design these according to their needs.

Figure 2 illustrates how the OHSMS requirements, described in this standard, can enhance the approach to managing health and safety program activities (e.g., hazard identification and risk reduction). The circle in the middle of the diagram shows the OHSMS continual improvement cycle based on the recognized quality concept of "Plan-Do-Check-Act."

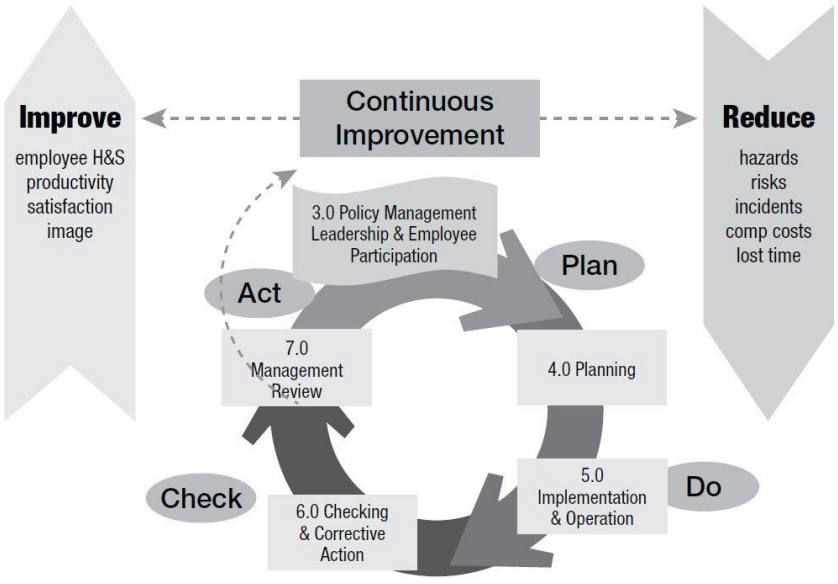

Figure 2-OHSMS Cycle

The OHSMS cycle entails an initial planning process and implementation of the management system, followed by a process for checking the performance of these activities and taking appropriate corrective actions. The next step involves a management review of the system for suitability, adequacy, and effectiveness against its policy and this standard. The complete cycle is repeated, resulting in ongoing continual improvements in occupational health and safety. Improvements result from reducing hazards and risks in a systematic manner – a goal traditionally pursued through independent programs that often are not coordinated through common management principles and processes.

The processes that drive implementation of the organization's management system also facilitate improved teamwork and operational performance. It places less reliance on single individuals and more emphasis on an organization's process and teamwork to maintain business functions even as personnel changes (a person's absence) occur. In addition to the direct benefits of improved employee health and safety, a management system can also yield positive business outcomes, including enhanced productivity, financial performance, and employee satisfaction.

The management system approach is characterized by its emphasis on continual improvement and systematically eliminating the underlying or root causes of deficiencies. For example, in a systems approach, if an inspection finds an unguarded machine, not only would the unguarded machine be fixed, but there would also be a systematic process in place to discover and eliminate the underlying reason for the deficiency. This process might then lead to the goal of replacing the guards with a more effective design, or to replacement of the machines themselves so the hazard is eliminated. This systematic approach seeks a long-term solution rather than a one-time fix.

This standard is formatted into two columns to help distinguish requirements from recommended practices and explanatory information. Requirements are in the left column and are identified by the word "shall." An organization that chooses to conform to this standard is expected to fulfill these requirements. The text in the right hand column uses the word "should" to describe recommended practices, or explanatory notes to the requirements on the left. This use of the terms "shall" and "should" to identify requirements and distinguish them from recommendations and explanatory notes is common practice in ANSI and international standards. As a convenience, some section titles and subtitles are footnoted to reference helpful documents in the bibliography.

This standard was processed and approved through ANSI by the Z10 Accredited Standards Committee on Occupational Health and Safety Management Systems. Committee approval of the standard does not necessarily imply all committee members voted for its approval. The ANSI accredited Z10 Secretariat, Committee, or individual committee members accept no legal responsibility for the correctness or completeness of this material or its application to specific factual situations. By publication of this standard, the Z10 Committee does not ensure adherence to these recommendations will protect the safety or health of any persons, or preserve property.

5.1.3 Design Review and Management of Change [21-30]
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

The numbers below a section title or subtitle refer to references in the bibliography. (Appendix O)

At the time it approved this standard, the Z10 committee had the following members:

James Howe, CSP, Chair
Vic Toy, MPH, CIH, CSP, Vice Chair
Timothy R. Fisher, CSP, CHMM, ARM, CPEA, Secretary
Ovidiu Munteanu, Assistant Secretary
Jennie Dalesandro, Administrative Technical Support

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American Association of Occupational Health Nurses, Inc.	Mary Gene Ryan, MPH, BSN, COHN-S/SM, CSP, FAAOHN
American Chemistry Council	Daniel Roczniak
American College of Occupational and Environmental Medicine	A.L. Jones, MD, MS, FACOEM
American Federation of State, County & Municipal Employees	Diane Matthew Brown, CET
American Foundry Society	Thomas Slavin, CIH, CSP, CSHM, CPEA
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American Petroleum Institute	Angelo Pinheiro, MS, CSP, CRSP, CPEA
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CPWR: The Center for Construction Research and Training	Bruce Lippy, Ph.D., CIH, CSP Babak Memarian
Deere & Company	Scott Fowler
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ENLAR Compliance Services, Inc.	Thea Dunmire, JD, CIH, CSP
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Liberty Mutual Insurance	John Rabovsky, MS, CSP, ARM
M.C. Dean, Inc.	John Bennett, CHCM Aaron Schoemaker, CSP

Marshfield Clinic	
National Institute for Occupational Safety & Health	Paul Schulte
National Nuclear Security Administration	Stephen Wallace, P.E., CSP
National Safety Council	Jonathan Thomas
North Carolina Department of Transportation	Frank Beck Scott Mabry
Nucor Corporation	Tim Reeves George Stephenson
ORCHSE Strategies, LLC	Scott Madar, CIH
Risky Biz Services Inc.	C. Gary Lopez, CSP
Safety Solutions Inc.	Jim Howe, CSP
Siemens Healthcare Diagnostics Inc.	Robert Friedman, MS
State University of New York	Mary O' Reilly, Ph.D., CIH, CPE
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U.S. Army Corps of Engineers	Bonnie Rathbun, CIH, CET Sandra Parker-Monk, CIH
U.S. Department of Labor - OSHA	Mark Hagemann William Zettler
UAW	Andrew Comai, MS Sean Coughlin
United Food and Commercial Workers International Union	Robyn Robbins, CIH
United Steelworkers of America	Michael Wright James Frederick, MS
United Technologies	Jonathan Hughes
University of Alabama	William Weems, Dr.P.H., CIH Terry Crotwell, MS, CSMP
Voluntary Protection Programs Participants' Association	Christopher Colburn, MEng, CSP, CHMM Phil Walsh

American National Standard — Occupational Health and Safety Management Systems

1.0 Scope, Purpose, & Application

1.1 Scope

This standard defines minimum requirements for an occupational health and safety management system (OHSMS).

E1.1: The basic elements of the standard address management leadership and employee participation, planning, implementation, evaluation and corrective action and management review, as described in the corresponding sections. The processes required in this standard are interrelated for continual improvement. This system model goes beyond a simple sum of individual or isolated health and safety programs and activities, such as incident investigation, inspections, and training. The management system in this standard is designed to continually improve safety and health performance, and is aligned with the traditional Plan – Do – Check – Act approach for improving the workplace.

This standard provides basic requirements for occupational health and safety management systems, rather than detailed specifications. This approach is designed to provide flexibility to conform to this standard in a manner appropriate to each organization and commensurate with its occupational health and safety risks. The standard defines what has to be accomplished in generic performance terms, but it leaves the how to each organization. This standard provides a systems approach intended to complement consensus and other standards that provide safety and health guidance for specific industry sectors, processes, and tasks – some of which are referenced in Appendix O. This is because the risks, organizational structure, culture, and other characteristics of each organization are unique, and each organization has to define its own specific measures of performance.

1.2 Purpose

The primary purpose of this standard is to provide a management tool to reduce the risk of occupational injuries, illnesses, and fatalities.

E1.2: Organizations and the community may see additional benefits of implementing an OHSMS beyond the reduction of injury and illnesses. Some of these benefits may include: lowered Workers' Compensation costs; reduced turnover of personnel; reduced lost workdays; compliance with laws and regulations,

increased productivity; improved employee health status; improved product quality, higher morale of employees; reduction or elimination of property damage due to incidents; reduced business interruption costs, reduced impact on the environment due to incidents and an enhanced public image.

1.3 Application

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

The word “shall” is used for requirements. An organization that chooses to conform to this standard is expected to meet these requirements. Recommendations and explanatory notes are identified by the word “should.”

In no instance shall the exercise of a legal right or privilege or the fulfillment of a legal obligation by an organization, its employees or authorized representative be considered a nonconformance with any requirement of this standard. Those asserting these rights shall find alternative methods to conform to the standard consistent with the assertion of those rights.

E1.3: This standard is designed so it can be integrated with quality, environmental, and other management systems within an organization. It can also assist organizations to evaluate and improve existing OHSMS.

In several places in the standard, the organization is directed to establish a process for accomplishing a management system activity or function. When the standard states that “the organization shall establish a process,” this is intended to mean that the organization will establish, implement and maintain the identified process. Although the standard uses the terminology “a process,” the organization may establish several processes instead of only a singular process, if that is more appropriate to its needs.

2.0 Definitions

Audit: A systematic, independent and documented process for obtaining information and data and evaluating it objectively to determine the extent to which defined audit criteria are fulfilled. *Note: Independent does not necessarily mean from another organization. Independence means not being responsible for the activity being audited or free of bias and conflict of interest. This means you cannot audit your own work.*

Compliance: Meeting the requirements of local, state, or federal statutes, standards, or regulations.

Conformance: Meeting the requirements of the organization's OHSMS and this standard.

Continual Improvement: The process of enhancing the OHSMS to achieve ongoing improvement in overall health and safety performance in line with the organization's health and safety policy and performance objectives.

Contractor: A person or organization providing services to another organization in accordance with agreed upon specifications, terms, and conditions.

Corrective Action: Action taken to eliminate or mitigate the cause of a system deficiency, hazard, or risk (e.g. Fix an existing problem).

Document (noun): Written, electronic, or photographic information such as a procedure or record.

Documented (verb, adjective): Substantiated through the use of documents.

Employee: A person who is employed by the organization or by a contractor to the organization when that person is under the day-to-day control of the organization.

Employee Representative: An individual authorized by other employees to represent them (1) through a union representing the interests of employees in accordance with the provisions of national or state laws and regulations or collective bargaining agreements or (2) through any other selection process allowed by law.

Ensure: To make every reasonable effort to fulfill the requirement.

Exposure: Contact with or proximity to a hazard, taking into account duration and intensity.

Exposure Assessment: The process of measuring or estimating the exposure profiles of workers, including the relevant characteristics of the exposures such as the duration and intensity.

Hazard: A condition, set of circumstances, or inherent property that can cause injury, illness, or death.

Incident: An event in which a work-related injury or illness (regardless of severity) or fatality occurred or could have occurred (commonly referred to as a "close call" or "near miss").

Non-conformance: A deficiency in meeting one or more of the organization's or this standard's OHSMS requirements.

Occupational Health Assessment: The collection, analysis, recording and reporting of biological and other data to identify, evaluate and track potential or actual health effects that are associated with being in the work environment

Occupational Health and Safety Management System (OHSMS): A set of interrelated elements that establish and/or support occupational health and safety policy and objectives, and mechanisms to achieve those objectives in order to continually improve occupational health and safety.

OHSMS Issues: Hazards, risks, management system deficiencies and opportunities for improvement.

Organization: A public or private company, corporation, firm, enterprise, authority, or institution, or part or combination thereof, whether incorporated or not, that has its own management functions. This can consist of one or many sites or facilities.

Preventive Action: Action taken to reduce the likelihood an underlying system deficiency or hazard will occur or recur in another similar process. (Fix a potential problem).

Record: A document showing or stating results achieved or providing information or data of activities performed.

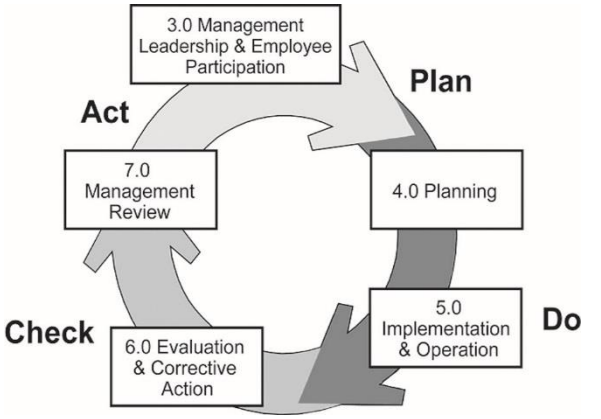
Risk: An estimate of the combination of the likelihood of an occurrence of a hazardous event or exposure(s), and the severity of injury or illness that may be caused by the event or exposures (See Appendix F).

Risk Assessment: Process(es) used to evaluate the level of risk associated with hazards and system issues.

Top Management: Person or group of people who direct and control the operation of an organization.

3.0 Management Leadership and Employee Participation

This section defines the requirements for management



leadership and employee participation. Top management leadership and effective employee participation are crucial for the success of an Occupational Health and Safety Management System (OHSMS).

3.1 Management Leadership

3.1.1 Occupational Health and Safety Management System

Top management shall direct the organization to establish, implement and maintain an OHSMS in conformance with the requirements of this standard that is appropriate to the nature and scale of the organization and its occupational health and safety risks.

E3.1.1: Leadership begins with top management providing the directive for integrating health and safety into the daily functions of the business.

3.1.2 OHS Policy

The organization's top management shall establish a documented occupational health and safety policy as the foundation for the OHSMS. This policy shall include a commitment to:

A. Protection and continual improvement of employee health and safety;

B. Effective employee participation;

C. Conformance with the organization's health and safety requirements; and

D. Compliance with applicable occupational health and safety laws and regulations.

The OHS Policy shall be communicated to employees, made available to relevant external interested parties as

E3.1.2: These four elements are essential for an effective policy, and should be expressed in the manner that best reflects the organization's culture and health and safety values.

E3.1.2D: While the policy is expected to contain a commitment to compliance with applicable health and safety laws and regulations, it is understood that even the most effective OHSMS will not ensure an organization is in total compliance at any particular point

appropriate, dated, and signed or otherwise officially authorized and endorsed by top management.

3.1.3 Responsibility and Authority

Top management shall provide leadership and assume overall responsibility for implementing, maintaining, and monitoring performance of the OHSMS; including:

A. Providing appropriate financial, human and, organizational resources to plan, implement, operate, check, correct and, review the OHSMS;

B. Defining roles, assigning responsibilities, establishing accountability, and delegating authority to implement an effective OHSMS for continual improvement;

C. Integrating the OHSMS into the organization's other business systems and processes and assuring the organization's performance review, compensation, reward and recognition systems are aligned with the OHS policy and the OHSMS performance objectives.

Employees shall assume responsibility for aspects of health and safety over which they have control, including adherence to the organization's health and safety rules and requirements.

in time. Under such circumstances, an organization should not be considered out of conformance with this standard so long as it's OHSMS, as implemented, results in the prompt detection and correction of the system deficiencies that contributed to the instances of noncompliance.

In addition to employees and employee representatives, it may be useful to share this policy with various stakeholders, e.g. suppliers, customers, contractors, local communities, and other interested and affected parties. Appendix A contains examples of methods for communicating the policy.

E3.1.3: The roles and responsibilities should be documented. See Section E5.4.

Top management should not simply delegate implementation of the OHSMS to other members of management. Visible leadership by management sets the tone for the entire organization which is much more effective than if driven by health and safety staff. Top management involvement and commitment can be measured by inclusion of the OHSMS as an element of the organization's business plan, time spent on OHS, visible personal participation, and number of OHSMS tasks performed.

Leadership by top management includes communicating not only what needs to be done but why it should be done. Addressing the 'why' of safety for all personnel can contribute to better acceptance and implementation.

E3.1.3C: Examples of other business systems that integrate OHSMS include:

- Purchasing, production and quality;
- Human Resource recruitment, training, worker and incentive compensation systems;
- Environmental waste and permit management systems;
- External Regulatory, Community Affairs, and Sustainability communication teams;
- Materials and/or Facilities Management and Safety Data Sheet (SDS) information systems; and
- Risk Management and Insurance information systems.

As an example, one of the integration links of Human Resources and OHSMS systems might share annual

3.2 Employee Participation (1-4)

The organization shall establish a process to ensure effective participation in the OHSMS by its employees at all levels of the organization, including those working closest to the hazards by:

A. Providing employees and employee representatives employed by the organization with the mechanisms, time, and resources necessary to participate in, at a minimum, the processes of:
   - Planning (4.0);
   - Implementation (5.0);
   - Evaluation, corrective action, and preventive action (6.0);

B. Providing employees, and employee representatives, with timely access to information relevant to the OHSMS; and

C. Identifying and removing obstacles or barriers to participation.

information to each other to determine how company managers may have performed relative to last year's organizational safety and health objectives and to set appropriate safety and health objectives for the coming year.

Examples of aspects over which employees may have control include working within procedures, communicating concerns, and reporting problems, injuries and near miss events

E3.2: This provision is applicable to all employees, but it should give special emphasis to participation by non-supervisory employees because they are often those closest to the hazard, and often have the most intimate knowledge of workplace hazards. In addition, non-supervisory employees are a valuable but often overlooked resource for improving health and safety.

Employers should use multiple strategies of employee involvement. Appendix C provides examples of effective employee participation as well as barriers to participation that may adversely impact the overall effectiveness of engaging employees

E3.2A: The intent of this requirement is to encourage employees to:

- Have meaningful involvement in the structure, operation, and pursuit of the objectives of the OHSMS;
- Identify tasks, hazards and risks, and possible control measures; and
- Participate in planning, evaluation, and implementation of control measures.

Several of Dr. W. Edwards Deming's Points address participation issues such as "constancy of purpose", "drive out fear," "break down barriers" and "eliminate exhortations." These points are particularly appropriate as the underpinning of an effective OHSMS.

Effective employee participation should include a role in activities such as incident investigations, procedure development, health and safety related audits, training development, job safety analysis, use of occupational risk management processes, and all aspects of the planning process. One common mechanism for employee participation is involvement in health and

safety committees. Safety committee formation and function in U.S. workplaces are subject to the National Labor Relations Act.[6] Individuals (e.g. volunteers, unpaid interns, students, inmate labor) not employed by, but who perform work for, the organization should be included in the above activities.

E3.2B: Relevant information should include issues, objectives and implementation plans of the OHSMS, results of incident investigations, health and safety monitoring data and/or exposure assessments, human factors evaluations, health and safety committee records, injury and illness data, risk assessments, and control programs and activities. In some circumstances, incident investigations or audits performed under legal privilege may have limited distribution.

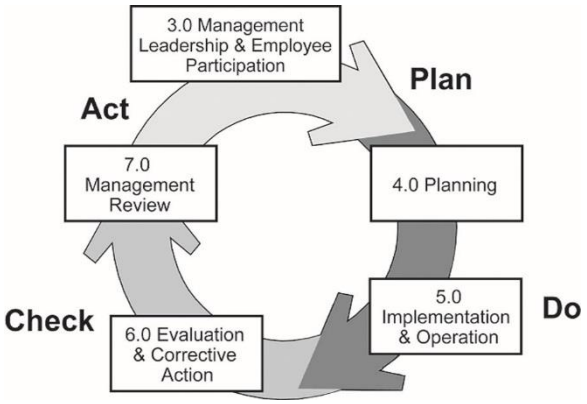
Timely access refers to the provision of information to maximize effective participation.

E3.2C: Given the importance of employee participation as well as accurate injury and illness data, employees should be encouraged to report injuries, illnesses, accidents, incidents, deficiencies and concerns. Properly designed programs can be used to promote employee participation in activities such as reporting problems and making safety improvement suggestions.

Incentive programs, drug testing programs, and disciplinary mechanisms should be carefully designed and implemented to ensure employees are not discouraged from effective participation in the OHSMS.

Examples of obstacles or barriers include lack of response to employee input or suggestions, reprisals (supervisory and/or peer), or any policy, practice or program that penalizes or discourages participation.

4.0 Planning



This section defines the planning requirements for an OHSMS. The planning process goal is to identify and prioritize OHSMS issues (defined as hazards, risks, management system deficiencies and opportunities for improvement) and to establish objectives which offer the greatest opportunities for OHSMS improvements and risk reduction consistent with the organization's OHS policy.

The planning process, as described in this section, sets requirements for the establishment and implementation of processes to:

A. Review relevant information to identify OHSMS issues related to occupational health and safety performance (Section 4.1)
B. Prioritize the OHSMS issues identified during the review (Section 4.2);
C. Develop objectives for the system and for risk control, based on the prioritized OHSMS issues (Section 4.3); and,
D. Formulate implementation plans to accomplish the prioritized objectives (Section 4.4).

E4.0: The planning in this section is an ongoing and recurring process to help identify OHSMS issues, prioritize them and implement plans to achieve objectives.

There are various ways in which activities are planned. In a management system context, planning in this section is done on a periodic basis in order to identify the more strategic activities that help identify the best opportunities for continual improvement. Operational plans, which address the day to day activities, are implemented in Section 5. The use of the term "operational" in this context and throughout the standard is used broadly to address tactical equipment/task level processes and issues rather than management system processes or issues.

Refer to Section 6.4 for corrective and preventive action, including correction of imminent hazards uncovered during the course of the planning process.

4.1 Review Process

The organization shall gather and review information to identify OHSMS issues, which includes the processes necessary to establish or improve its management system.

The organization shall establish a review process that identifies the differences between its OHSMS and the requirements of this standard, including Management Leadership and Employee Participation (Section 3),

E4.1: Organizations should conduct a review of their OHSMS, often called a gap analysis, to identify differences between their management system and the requirements of this standard.

Organizations often call the first review conducted to achieve conformity with this standard the "initial review." The organization should periodically conduct reviews and update appropriate documentation.

Planning (Section 4), Implementation and Operation (Section 5), Evaluation and Corrective Action (Section 6), and Management Review (Section 7).

The review shall include information regarding:

A. Relevant business systems and operational processes;
B. Operational issues such as, hazards, risks, and controls;
C. Previously identified OHSMS issues
D. Allocation of resources;
E. Applicable regulations, standards, and other health and safety requirements;
F. Risk assessments and evaluations;
G. Process and mechanisms for employee participation;
H. Results of audits; (see Section 6.3) and
I. Other relevant activities.

Organizations should maintain documentation of the most recent reviews.

To identify its OHSMS issues, the organization should review a wide array of relevant information to identify both system and operational issues (e.g., hazards and risks) that are significant to the organization. The system review is primarily intended to emphasize both system and process issues that often underlie operational issues.

E4.1A: The intent of this requirement is to review management systems in areas that may be outside the traditional context of health and safety programs and activities, but nonetheless affect occupational health and safety. Examples of such systems include procurement, engineering, performance, and qualifications of employees carrying out OHSMS responsibilities, quality, environmental, and recognition systems. The organization should pay particular attention to compensation systems. The positive or negative impacts of all of these systems on the effectiveness of the OHSMS are often profound. The review should also include consideration of work organization, programs, policies, procedures, and workflow.

System reviews are focused on management system elements and are not specific to operations.

Examples include:

- Determination of resource levels and expertise;
- Effectiveness of communication and employee participation;
- Review of change management timelines and effectiveness.

System reviews may be input for decisions made during management reviews (See Section 7 – Management Review).

E4.1B: While the primary goal is to focus on management system issues, many of the operational issues are the result of management system deficiencies. The review can be a valuable resource for assessing the management system. Operational issues may include hazards, health and disaster related emergencies, as well as emergency events that may arise from the characteristics of the materials,

processes, and activities of the workplace or of neighboring activities.

E4.1D: Resources should include funding, personnel, equipment, mechanisms, and results of employee input into the OHSMS and data systems. Resources may be internal or external.

E4.1F: Results of risk assessments as described in Section 5.1.1 Risk Assessment and Appendices D and F should be included in the review. Evaluations included in the review should include data such as loss control data and Workers Compensation case information, compliance status, injury/illness metrics, findings of incident investigations (including near misses and close calls), audits, and monitoring and measurement. If an organization has not yet done a workplace inspection, it should do one as part of the review.

E4.1H: The results of the management system audits (Section 6.3) can provide information useful to the planning review process. For example, internal audits can check whether the risk assessments performed reflect the actual workplace conditions and practices. The review in 4.1 is not intended to replace the audit process set out in Section 6.3.

E4.1I: Other relevant activities may include contractor activities, maintenance, and non-routine operations.

4.2 Assessment and Prioritization (5-6)

The organization shall establish a process to assess and prioritize its OHSMS issues on an ongoing basis as 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 improvements, 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.

E4.2: The method of assessment should be selected based on the type of issue, nature of risk, or operations. For example, system issues such as lack of a Management of Change process or a non-conforming Management Review process may be assessed using multiple methods that consider level of risk imposed, financial impact and regulatory compliance.

Various methods of assessment can be used to evaluate and prioritize OHSMS issues. As with other business issues, setting priorities may require judgment based on several factors such as the following:

- Issues requiring immediate attention
- Opportunities with the greatest potential for improvement or risk reduction
- Organization, resource, participation or accountability issues or other conditions that are fundamental to improvement in other areas

- Issues with the highest impact or severity.

This process must be defined so it can be leveraged periodically to help identify new objectives (Section 4.3).

Appendix D provides additional guidance on assessment and prioritization.

Operational issues are often assessed using a risk assessment process (see Section 5.1.1 Risk Assessment), regulatory review and/or internal organizational guidelines and practices. Appendix F provides additional information on risk assessment, a review of basic concepts and lists various methods commonly in use in the U.S.

The prioritized list of OHSMS issues should be documented. See Section E5.4.

E4.2A: The assessment of risks should include factors such as the following:

- Identification of potential hazards;
- exposure;
- measurement data;
- sources and frequency of exposure;
- human behavior, capabilities, and other human factors;
- types of measures used to control hazards, and
- potential severity of hazards. It is recommended to consider not only high probability hazards but also high severity/low probability hazards.

Assessments conducted in this section are only for the purpose of prioritizing occupational health and safety issues and may not be complete or sufficient to determine appropriate hazard controls. (see Section 5.1.2 for more information on Hierarchy of Controls).

Examples of various risk assessment methodologies are included in Appendix F – Risk Assessment and Appendix O – Bibliography and References.

E4.2B: Business consequences may include either increased or decreased productivity, sales or profit or public image.

E4.2C: Underlying causes related to system deficiencies that contribute to hazards and risks may include the following:

- Human resource issues such as those involving staffing, training, culture, capability, or job demands;

- Machine, processor equipment issues such as a lack of a formal process to assess guarding, maintenance, hazardous material controls or design;
- Management issues such as measurements, supervision, accountability, communication or participation;
- Methods issues such as rules, practices or procedures, and
- Facility and work site environment issues such as layout, ventilation, and lighting.

4.3 Objectives

The organization shall establish a process to set documented objectives, quantified where practicable, based on issues that offer the greatest opportunity for OHSMS improvement and risk reduction. The number and content of objectives shall be:

A. Based upon the priorities developed in Section 4.2;
B. Focused on system improvements to eliminate or control in a sustained manner the underlying causes and contributing factors associated with risk;
C. Consistent with the organization's occupational health and safety policy;
D. Set, reviewed, and modified at appropriate intervals to reflect efforts to achieve continual improvement; and
E. Modified according to changing information and conditions that impact schedule or attainment.

E4.3: While organizations are not expected to set objectives for every OHSMS issue identified, they should set sufficient objectives to reduce risk and improve the workplace in a measurable manner. In doing so, it is often useful to focus on those objectives that will provide the greatest improvement in employee health and safety. Focusing on critical objectives can often be linked to improvements in organizational performance. Where appropriate, objectives may have a qualitative or quantitative measurement. Organizations are not expected to create objectives or implementation plans for quickly resolved "find and fix" issues.

4.4 Implementation Plans and Allocation of Resources

The organization shall:

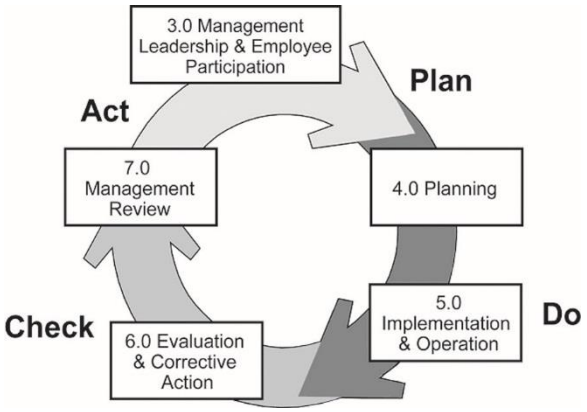
A. Establish and implement a documented implementation plan for achieving the objectives. The plan(s) shall define resources, responsibilities, timeframes, intermediate steps, and appropriate measurements of progress.
B. Assign resources to achieve the established objectives of the implementation plans.
C. Periodically review and update the plan.

E4.4A: Organizations have the choice to create an implementation plan for each objective or an implementation plan that addresses multiple objectives.

E4.4B: Resource allocation should be consistent with the timeframe in the implementation plan.

E4.4C: Implementation plans should be periodically reviewed and updated as necessary to reflect changes in policies, objectives, activities, products, services, or operating conditions of the organization.

5.0 Implementation and Operation



This section defines the operational elements that are required for implementation of an effective OHSMS. These elements provide the backbone of an OHSMS and the means to pursue the objectives from the planning process. The application of these elements also systematically generates experience and knowledge that are fed back to the planning process on an ongoing basis, in order to support continual improvement.

E5.0: The lessons drawn from the successes and setbacks of the everyday implementation of the operational elements are a critical, continuing source of experience and knowledge that are fed back to the planning process to improve the development of objectives and the overall OHSMS.

5.1 OHSMS Operational Elements

The organization shall:

A. Establish and implement the operational elements defined in this section, as applicable to the organization and its activities, achieve the objectives arising from the planning process, and

B. Integrate the operational elements into the management system.

E5.1A: Many organizations have existing occupational health and safety management systems or successful programs in occupational health and safety that include some or many of the elements described in this section.

E5.1B: This requirement does not imply that such activities need to be scrapped to conform to this standard. Any existing risk control programs or elements that are effective and consistent with the organization's policies and the achievement of its objectives should be integrated into the new or revised OHSMS, as appropriate.

5.1.1 Risk Assessment (7-20)

The organization shall establish and implement a risk assessment process(es) appropriate to the nature of hazards and level of risk.

E5.1.1: Assessing risks can be done using quantitative (numeric) or qualitative (descriptive) methods. There are many methods of risk assessment. The organization should select methods appropriate to the hazards and type of process. Appendix F provides an overview of a generic risk assessment process and a listing of several methods. The bibliography includes several risk assessment resources.

5.1.2 Hierarchy of Controls

The organization shall establish 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 controls, and
F. Personal protective equipment.

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

- The nature and extent of the risks being controlled;
- The degree of risk reduction desired;
- The requirements of applicable local, federal, and state statutes, standards and regulations;
- Recognized best practices in industry;
- Available technology;
- Cost-effectiveness, and
- Internal organization standards.

E5.1.2: The hierarchy provides a systematic way to determine the most effective feasible method to reduce 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. This is best accomplished in the concept and design phases of any project. Refer to Section 5.1.3. 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, (e.g. warnings, administrative controls, or personal protective equipment) are used to complement engineering controls to reduce risks to an acceptable level. 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.

E5.1.2E: 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.

5.1.3 Design Review and Management of Change (21-30)

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 human errors caused by design deficiencies;

E5.1.3: The design review should consider all aspects including design, procurement, construction, operation, maintenance, and decommissioning.

"Management of Change" is the process to identify and manage changes to minimize the introduction of new hazards and risks into the work environment. Examples include changes in technology, equipment, facilities, work practices and procedures, design specifications, raw materials, organizational staffing changes, and standards or regulations.

E5.1.3B: Examples of deficiencies in design that may lead to human error include:

- machine controls are difficult to access

C. Review of applicable regulations, codes, standards, internal and external recognized guidelines

D. Application of control measures (hierarchy of controls – Section 5.1.2);

E. A determination of the appropriate scope and degree of the design review and management of change; and

F. Employee participation

- control labels are worn or otherwise difficult to read
- inconsistent color-coding
- points of operation are difficult to see
- remote power boxes
- failures to label or color code pipes
- inconsistent control layout
- non-customary measures and labels in different languages.

The design of machines, equipment, and facilities should take human factors (the characteristics and capabilities of humans) into account. For example, warning lights should be designed to attract attention, based on the ability of the human eye to detect and respond to light at different frequencies. Workstations should be designed to fit the user(s). The process and results of design reviews should be documented. See Section E5.4.

E5.1.3E: 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;
- 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 equipment, and
- New health and safety standards or regulations.

E5.1.3F: Design review and Management of Change effectiveness is enhanced when employees with knowledge and experience of equipment, processes, facilities and systems participate in the process. Such participation often includes identifying tasks, hazards, and feasibility of control measures.

See Appendix F: Risk Assessment for more information on risk assessment methodologies to consider when assessing risks during design reviews and managing hazards and risks associated with operational change.

5.1.3.1 Applicable Life Cycle Phases

During the design and redesign processes all applicable life cycle phases shall be taken into consideration.

E5.1.3.1: The design process typically includes consideration of some or all of the following life cycle phases:

1. Concept design stage
2. Preliminary design
3. Detailed design
4. Build or purchase process
5. Commissioning, installing and debugging processes
6. Production and maintenance operations
7. Decommissioning activity

It may be useful to consider whether to purchase an item, contract for the finished goods, or use another approach prior to buying equipment and installing add-on controls.

5.1.3.2 Process Verification

The organization shall have processes in place to verify that changes in facilities, documentation, personnel and operations are evaluated and managed to ensure safety and health risks arising from these changes are controlled.

E5.1.3.2: These types of processes are sometimes referred to as Management of Change.

The Management of Change process should take into consideration relevant items such as:

- technology, equipment, work practices and procedures
- design specifications and raw materials
- organizational or staffing changes standards or regulations

Management of Change includes changes being made in existing operations, products, or services.

5.1.4 Procurement

The organization shall establish a process 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 purchased products, raw materials, and other goods and related services conform to the organization's health and safety requirements.

E5.1.4: The procurement process should be documented. See Section E5.4.

E5.1.4A: For example, organizations should evaluate SDS (Safety Data Sheets) 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.

E5.1.4C: Related services may include warranty repair, training, tools, and equipment maintenance, and those provided by contractors.

5.1.5 Contractors (31-36)

The organization shall establish a process to identify, evaluate and control potential health and safety risks:

E5.1.5: The organization may delegate authority to those best capable of identifying, evaluating, and controlling health and safety risks. This recognizes some contractors possess specialized knowledge, skills,

A. To the organization's employees from contractors' planned and unplanned activities, operations, and materials on the organization's premises; and

B. To the contractors' employees from the organization's activities and operations.

This process shall include appropriate contractor health and safety performance criteria.

On multi-employer worksites, the organization shall implement a process for coordinating the relevant portions of its OHSMS with other applicable organizations.

methods, and means. This does not eliminate the organization's responsibility for the health and safety of its own employees.

Contractors may include maintenance, construction, operations, security, landscaping, facility upkeep, janitorial, sanitation or clean-up of production process and a number of other functions. Organizational Contractors may include consultants, administrative, accounting, and other functions.

Management typically achieves coordination through the use of contracts that clearly define the responsibilities of the parties. Organizations have a variety of tools for managing contractor health and safety performance, including contract award mechanisms or pre-qualification criteria which consider past health and safety performance, safety training, or health and safety capabilities, as well as direct contract requirements.

The relationships between organizations and their contractors can be both diverse and complex, and involve very different types and levels of risk. How an organization manages these relationships may vary, depending on the nature of the service provided and the risks identified. The degree of coordination should depend on factors such as the terms of the contract, the nature of the hazards and risks, the type and size of the operations, and the duration of the work on the site. Items to consider for the coordination process include reporting of hazards between organizations, controlling employee access to hazardous areas, and procedures to follow in emergencies.

If one or more of the other organizations do not have an OHSMS, then the organization with the OHSMS should communicate with the other organizations to coordinate its OHSMS with any similar activities, such as those used with confined space entry, lockout/ tagout, exposure assessment, and process safety management.

5.1.6 Emergency Preparedness (37-41)

The organization shall establish a process to identify, prevent, prepare for, and/or respond to emergencies, including:

A. Development of plans to prevent and minimize risks from potential emergencies;

E5.1.6: Organizations should identify foreseeable emergencies, both natural and man-made, applicable to their operations. Identified emergencies should be assessed based on health and safety risks, and focus should be given to prevention and response actions.

B. Periodic testing of the emergency plans through drills and similar activities; and

C. Evaluating and updating the plans and procedures as necessary.

Emergency response plans should be appropriate for the size, nature and needs of the organization and provide for:

- Complying with legal and other requirements;
- The availability of emergency response resources (e.g., medical rescue, crisis response, law enforcement, fire departments, etc.);
- The necessary information, internal communication, and coordination to protect all people, including contractors and visitors, in the event of an emergency at any worksite controlled by the organization;
- Informing and communicating with all employees, contractors, and visitors, as well as with the relevant authorities, the neighboring community, and emergency response and medical services;
- Addressing evacuation routes and procedures; and,
- Training members at all levels of the organization.

After every emergency or drill, the organization should evaluate the effectiveness of the plan, correct any deficiencies and identify opportunities for improvement.

The evacuation procedures should address individuals with special needs.

Emergency preparedness plans should be documented. See Section E5.4.

5.2 Education, Training, Awareness and Competence (42-45)

The organization shall establish a process to:

A. Define and assess the OHSMS competence needed for employees and contractors;

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

C. Ensure effective access to, and remove barriers to participation in education and training as defined in the organization's OHSMS;

D. Ensure training is provided in a language trainees understand; and

E. Ensure training is ongoing and is provided in a timely fashion.

F. Ensure trainers are competent to train employees.

E5.2A: Training in OHSMS responsibilities should include, for example, training for:

a. Engineers in safety design (e.g. hazard recognition, risk assessment, mitigation, etc…);

b. Those conducting incident investigations and audits for identifying underlying OHSMS non-conformances;

c. Procurement personnel on impact of purchasing decisions; and

d. Others involved with the identification of OHSMS issues, methods of prioritization, and controls.

E5.2B: Employee awareness of safety is essential for the OHSMS to be effectively implemented. This includes the why, what, when and how of safety. Employees at all levels of an organization should be aware of the risks and control measures associated with their job so they are not injured, are better prepared and are educated to

fully implement the OHSMS requirements. This awareness should include why safety is important.

Education and training on OHSMS issues can be included in the basic training of an employee on the performance of their job. This includes other individual(s), as defined by the organization (e.g. volunteers, unpaid interns, students, inmate labor), not employed by but who perform work for the organization.

Examples of hazard-related training include training in hazard identification, good safety practices, and use of personal protective equipment.

Organizations should periodically evaluate the effectiveness of training and education.

E5.2C: Barriers to participation can include disability issues, training on uncompensated time, scheduling, training environment, and literacy and language issues.

E5.2E: Training is most effective when conducted before employees are assigned to a job or task, and when changes in job assignment or tasks occur.

E5.2F: The organization should ensure competent health and safety personnel are available to participate in the implementation of the OHSMS, and to provide adequate expert technical consultation. This role may be filled by full- or part-time in-house personnel or by outside resources.

Competence is the ability to apply knowledge and skill to achieve intended results. It is normally achieved or demonstrated through one or more of the following: education, training, mentoring, experience, certification, licensing, and performance assessment.

Competence evaluation for trainers should include both subject matter expertise and proficiency as a trainer.

5.3 Communication

The organization shall establish a process to:

A. Communicate information about the OHSMS and implementation plan progress with affected levels of the organization and relevant external parties, including contractors.

B. Achieve prompt employee reporting of work-related injuries, illnesses, incidents, and hazards and risks.

E5.3A: The extent and nature of the communication should be tailored to the audience both in terms of desired detail and scope.

Communication of information about the OHSMS within the organization should include the organizations implementation plans.

C. Encourage employees to make recommendations regarding possible hazard control and reporting procedures.
D. Consult with contractors, and relevant external interested parties, when there are any changes that affect their OHS.
E. Identify and remove barriers to all of the above.

Consultation should be considered when changes have OHS impacts. Examples of other external parties to consider when developing communication processes include visitors, neighbors, emergency services, insurers and regulatory agencies.

E5.3D: The work activities of contractors can pose additional hazards for both employees and others in the workplace. Processes established for consultation with contractors should ensure risks will be appropriately addressed using good OHS practices. This consultation should include discussion and resolution of issues of mutual concern.

E5.3E: 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 employees are not discouraged from reporting job-related injuries, illnesses, hazards, and risks.

5.4 Document and Record Control Process

The organization shall establish a process to create and maintain documents and records specified by its OHSMS in order to 1) implement an effective OHSMS, and 2) demonstrate or assess conformance with the requirements of this standard. The process shall require that:

A. The OHSMS identifies documents which need to be controlled. These documents shall be reviewed and updated as necessary, with dates of revision.
B. Documents, including records, are legible, readily identifiable and accessible, protected against damage, deterioration, or loss, and retained for a specified period.

E5.4: The type and amount of formal documentation necessary to effectively manage an OHSMS should commensurate with the size, complexity, and risks of an organization. Large organizations commonly use substantial formal documentation and consider it value-added. Small organizations, on the other hand, may often be able to fulfill this requirement through more informal mechanisms that still clearly and effectively define roles and responsibilities and assure continuity of the processes. Where the OHSMS identifies documentation that needs to be controlled, there is no requirement to use a particular format nor is it necessary to create an individual document or record. Existing and/or multiple documents can be used to demonstrate conformance to this standard.

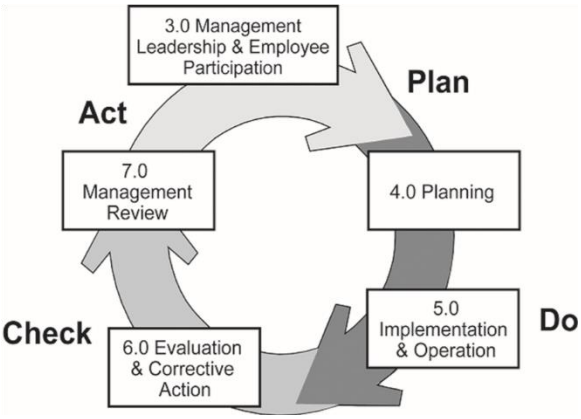
This standard explicitly requires documentation of the occupational health and safety policy (Section 3.1.2), objectives (Section 4.3), implementation plan (Section 4.4 A), audits (Section 6.3), and management reviews (Section 7).

An archival and records retention process would facilitate retention of historical knowledge for the organization and ensure outdated documents (e.g., prior versions of SOPs) are removed from use by the organization.

Some organizations specify top level data needed in a plan, such as overall description, owner and completion date in one document, while leaving the detailed tasks, resources and metrics to lower level implementers. Whether the data is in a single form or multiple forms should be based on the organization's needs.

E5.4A: A procedure is an example of a document that needs to be updated to be effective, whereas a training log is an example of a record that shows or demonstrates a completed activity, and is not typically modified.

6.0 Evaluation and Corrective Action



This section defines requirements for processes to:

A. Evaluate the performance of the OHSMS through monitoring, measurement, assessment, incident investigations and audits (6.1, 6.2, 6.3);
B. Take corrective action when non-conformance is found in the OHSMS (6.4); and
C. Include results of evaluation activities as part of the planning process and management review (6.5).

E6.0: The results of measurement and monitoring activities are used to determine whether the system is functioning as designed and according to the requirements of this standard, and also to insure that deficiencies are corrected and new opportunities for improvement are identified and fed back to the planning process.

6.1 Monitoring, Measurement, and Assessment

The organization shall establish a process to monitor and evaluate hazards, risks, and their controls to assess OHS performance.

These processes shall include some or all of the following methods, depending on the nature and extent of identified hazards and risks:

A. Workplace inspections and testing;
B. Exposure assessment;
C. Injury, illness, and incident tracking;
D. Employee input;
E. Occupational health assessment;
F. Assessment of performance relative to applicable legal and other requirements as determined by the organization; and
G. Other methods as required by the organization's OHSMS.

The results of these processes shall be communicated to relevant parties, with attention to applicable laws and regulations on medical confidentiality.

E6.1: The purpose of these processes is to help evaluate the performance of the management system by measuring its effectiveness in controlling and reducing risk.

Organizations should develop predictive or "leading" performance measures or indicators. The organization can use these measures to identify and correct problems and identify opportunities for risk reduction before injuries or illnesses occur. These leading indicators can be used in combination with carefully collected injury and illness rates to measure performance. Some examples of indicators of potential problem areas are risk associated with ergonomic factors, near-miss incidents, and non-conformances found during inspections. Examples of indicators that demonstrate the effectiveness of the OHSMS are the reduction of average exposure levels, the rate and timeliness of completion of corrective actions, the completion of required maintenance, or the completion of required training, and tests of their effectiveness. Indicators should be designed according to the hazards in the workplace.

For communication of monitoring and measurement, examples of relevant parties may include healthcare providers, supervisors, employees, and employee representatives. Communication should be tailored to the audience (see Section 5.3).

Monitoring and measurement processes should be conducted in accordance with recognized industry standards, practices, or manufacturer's specifications (e.g. equipment calibration and maintenance, analytical methods, survey instruments).

The results of these processes should be documented (see Section 5.4).

E6.1B: An exposure assessment should evaluate the health and safety hazards presented to employees as a direct result of their job. Exposure assessment is measuring, calculating or estimating an individual's contact with or proximity to a hazard, including relevant characteristics such as duration, frequency, and intensity or severity (e.g. qualitative risk assessment). In addition to traditional air or noise monitoring with properly calibrated and maintained equipment, some examples include proximity to dangerous heights, energized equipment, exposure to ergonomic risk factors, and hazardous radiation. Organizations should design exposure assessment processes and tools consistent with the nature of the hazards in the workplace.

E6.1C: Organizations should develop measures of performance that enable them to see how they are doing in preventing injuries and illnesses. Occupational injury and illness rates are a common yardstick for measuring the effectiveness of an OHSMS, and they can play a valuable role.

These rates, however, should rarely be the sole or primary tool to evaluate performance of an OHSMS, for several reasons. Primarily, these rates measure the very injuries, illnesses and material losses a management system is trying to prevent. When injury indicators are the only measure, there may be significant pressure for organizations to "manage the numbers" rather than improve or manage the process.

E6.1D: Examples of employee input could include employee/supervisor self-assessments and perception surveys. Another example is soliciting input from

employees on infrequent tasks that could result in serious or fatal injury.

E6.1E: Occupational health assessments can include medical examinations, biological monitoring, and a review of health records.

6.2 Incident Investigation

The organization shall establish a process to report, investigate and analyze incidents in order to address OHSMS non-conformances and other factors that may be causing or contributing to the occurrence of incidents. The investigations shall be performed in a timely manner.

E6.2: Incidents may be a symptom of a problem in the OHSMS. Traditionally, only incidents that result in reportable injuries or major damage are investigated. However, most incidents are preceded by warnings or close calls. An incident that does not result in an injury or damage is often referred to as a “close call” or “near miss.”

Incident investigations should begin as soon as practical. Experience shows valuable information may be lost when investigations are delayed.

The ultimate goal is to identify and correct hazards and system deficiencies before any injury or illness occurs. Incident investigations should be used for root cause analysis to identify system or other deficiencies for developing and implementing corrective action plans. Lessons learned from these investigations can then be fed into the planning or corrective action processes.

The incident investigation process should define what needs to be investigated, timeframes for an investigation, who should participate, and how recommendations to prevent recurrence should be generated and communicated.

In order for incidents to be investigated, they must be reported. Organizations should ensure all barriers to reporting are removed as per Sections 3.2 and 5.3 of this standard.

6.3 Audits (46-48)

The organization shall establish a process to:

A. Plan and conduct periodic audits to determine whether the OHSMS has been established, implemented and maintained in conformance with the requirements of this standard, including the processes for identifying hazards and controlling risks.

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. When conducting system audits, the process may assess how well the existing evaluation activities (e.g. compliance audit, inspections for hazards and risks) and corrective and preventive action activities are working, or how effectively they are providing

B. Audits shall be conducted by competent persons who are independent of the activity being audited.

C. 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.

D. Immediately communicate situations identified in audits that could be expected to cause a fatality, serious injury, or illness in the immediate future, so prompt corrective action under section 6.4 is taken.

feedback to the planning process to achieve continual improvement.

E6.3B: 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.

Employee participation should be encouraged on audit teams. Auditor competency should be appropriate to the scope and complexity of the audit to be performed.

Additional information on conducting management system audits can be found in ISO 19011, Management System Auditing.

E6.3C: Parties include affected contractors. Communication of audit findings should be consistent with existing company policy, legal, contractual, and labor management obligations.

6.4 Corrective and Preventive Actions (4)

The organization shall establish and implement corrective and preventive action processes to:

A. Address non-conformances and hazards that are not being controlled to an acceptable level of risk.

B. Identify and address new and residual hazards associated with corrective and preventive actions that are not being controlled to an acceptable level of risk.

C. Expedite action on high risk hazards (those that could result in fatality or serious injury/illness) that are not being controlled to an acceptable level of risk; and

D. Review and ensure effectiveness of corrective and preventive actions taken.

E6.4: An effective OHSMS should identify system deficiencies and control hazards in any part of the system to an acceptable level of risk. An organization needs to address all identified system deficiencies and inadequately controlled hazards to an acceptable level through the corrective and preventive action process, regardless of how those deficiencies and hazards were identified. This ensures corrective and preventive actions are undertaken in a systematic fashion, whereby the most serious hazards are addressed in an expedited fashion and all actions are followed through to completion.

E6.4B: Risk cannot typically be eliminated entirely, though it can be substantially reduced through application of the hierarchy of controls. Residual risk is the remaining risk after controls have been implemented. It's the organization's responsibility to determine whether the residual risk is acceptable for each task and associated hazard. Where the residual risk is not acceptable, further actions must be taken to reduce risk. See Appendix F.

E6.4C: Expedited actions should include efforts to discontinue the exposure by removing the person at risk, discontinuing the operation, or reducing the risk.

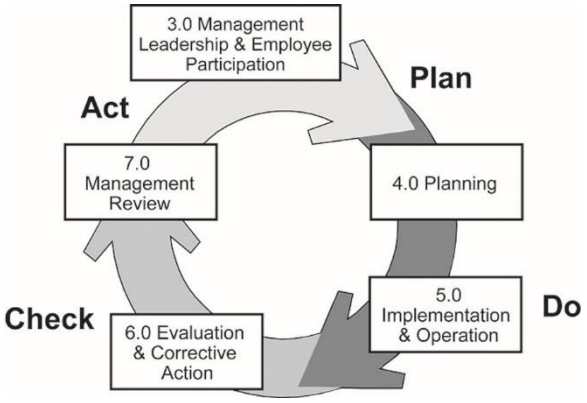
E6.4D: When corrective and preventive actions for an identified hazard will require a significant period of time to implement, immediate interim corrective action should be taken.

6.5 Feedback to the Planning Process

The organization shall establish process to ensure the results of monitoring and measurement, audits, incident investigation, and corrective and preventive actions are included in the ongoing planning process (Section 4.2) and the management review (Section 7).

E6.5: The findings and lessons arising from all evaluation and corrective action activities become part of the information that feeds back to the employee participation process (Section 3.2), ongoing planning process, and management review. This information is used to help determine the underlying causes and other factors contributing to system or risk control failures, and hence is used to establish revised objectives and implementation plans. This feedback loop is an essential component of the continual improvement of the OHSMS.

7.0 Management Review



This section defines the requirements for periodic management reviews of the OHSMS.

7.1 Management Review Process [4]

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

Inputs to the management review process shall include, among other information:

A. Progress in the reduction of risk;
B. Effectiveness of processes to identify, assess, and prioritize risk and system deficiencies;
C. Effectiveness in addressing underlying causes of risks and system deficiencies;
D. Input from employees and employee representatives;
E. Status of corrective and preventive actions and changing circumstances;
F. Follow-up actions from OHSMS audits and previous management reviews;
G. The extent to which objectives have been met; and
H. The performance of the OHSMS relative to expectations, taking into consideration changing circumstances, resource needs, alignment of the business plan and consistency with the Occupational Health and Safety policy.

E7.1: Management reviews are a critical part of the continual improvement of the OHSMS. The purpose of reviews is for top management, with the participation of OHSMS leaders and process owners, to do a strategic and critical evaluation of the performance of the OHSMS, and to recommend improvements.

This review is not just a presentation or a non-critical review of the system, but should focus on results and opportunities for continual improvement. It is up to the organization to determine appropriate measures of OHSMS effectiveness. They should also evaluate how well the OHSMS is integrated with other business systems, so it supports both health and safety goals and business needs and strategies.

Reviews by top management are required because they have the authority to make the necessary decisions about actions and resources, although it may also be appropriate to include other employee and management levels in the process. To be effective, the review process should ensure the necessary information is available for top management to evaluate the continuing suitability, adequacy, and effectiveness of the OHSMS. This should include factors outside of the traditional health and safety arena, such as vendor and internal organizational changes and security issues. Reviews should present results (for example a scorecard) to focus top management on the OHSMS elements most in need of their attention. Reviews may be conducted more

frequently, to coincide with other management reviews, or to meet other business or OHSMS needs.

At the conclusion of the reviews, top management should make decisions, give direction, and commit resources to implement the decisions.

The management review should include an assessment of the current OHSMS to address if the system is encompassing all of the risks to which the organization is exposed. This portion of the review should include a review of major risk exposures and ask the question, “Are there any holes” in the current OHSMS that could allow a risk that might not be considered within the OHSMS system.

The management review should consider the results of work-related injuries, illnesses, and incident investigations; performance monitoring and measurement; audit activities, and other relevant data.

Evaluating the effectiveness of the OHSMS should include a discussion of significant audit results and progress toward addressing non-conformances.

7.2 Management Review Outcomes and Follow-Up

At the conclusion of the review, top management shall determine the:

A. Future direction of the OHSMS based on business strategies and conditions; and

B. Need for changes to the organization’s policy, priorities, objectives, resources, or other OHSMS elements.

Action items shall be developed from the findings of the management review. Results and action items from the management reviews shall be documented, communicated to affected individuals, and tracked to completion (Section 6.4).

E7.2: OHSMS management review results should be summarized, specifying top management commitments and directives, as well as action items. Action items should specify responsible individuals and target completion dates.

Status of OHSMS management review action items should be periodically reported to top management until they are complete.

Affected individuals include those impacted by or responsible for addressing findings of the management review, so appropriate action may be taken. Examples of affected individuals include employees, contractors, employee representatives, and any existing health and safety committee(s), as applicable.

Appendices

These appendices are “informative” and not a requirement of this standard. They provide materials intended to assist users of the standard. They contain descriptions and examples of tools, references, and guidelines that may be integrated into the current management system of an organization. They can be adapted to meet an organization’s needs.

Being “informative,” these appendices are not part of the standard, and nothing in them should be construed to constitute additional requirements of the standard. These appendices are not comprehensive. They contain illustrative materials the committee felt might be helpful to users.

Materials in these appendices contain relevant information to assist organizations with implementation of the management system itself. Some of the appendices touch on procedures, job instructions, and documentation which may help organizations conform with the Z10 standard, and are offered as guidance for those who desire it.

Appendix A (Informative)

A. Policy Statements (Section 3.1.2)

Occupational Health and Safety (OHS) Policy

The OHS policy provides a starting point for everything the organization wants to achieve in occupational health and safety. The Policy establishes an overall sense of direction and sets the principles of action for an organization. It also demonstrates the formal commitment of an organization, particularly the organization's top management, towards effective OHS management. The policy should spell out the organization's commitment to protecting employee health and safety, as well as to continual improvement. Provision should be made for periodic review of the policy to ensure it continues to meet the organization's needs and health and safety requirements. The OHS Policy should reflect the organization's commitment to employee participation, and should be developed in consultation with employees. Once it is finalized, the OHS policy should be signed or officially issued by the most senior manager, to show commitment to high standards of health and safety comes from the top of the organization. The OHS Policy should be posted or circulated throughout the workplace so everyone knows about the policy and what it contains. It can be included in orientation training so new staff, contractors, customers, visitors, and other interested and affected parties understand the OHS Policy.

Example #1 – Policy Statement

The organization will uphold its position as a global leader by promoting occupational health and safety excellence.

Through management leadership and employee participation, the organization pledges to:

- Create a safe and healthy workplace;
- Build a respect for the environment;
- Continually improve its OHS performance;
- Conform to the spirit as well as the letter of applicable laws and regulations, and to the company's OHS Requirements;
- Integrate OHS considerations into business planning, decision making, and daily activities;
- Provide resources and training to carry out this policy; and
- Communicate our OHS policy to the community, employees, and affected parties.

Example #2 – Policy Statements

We are committed to protecting the health and safety of each employee as the overriding priority of the organization. There will be no compromise of an individual's well-being in anything we do. The implementation of actions to help realize a healthy, injury-free work environment is a leadership responsibility. To help ensure policy commitments are translated into appropriate actions, we recognize the importance of employee participation. We have a commitment to continual improvement of employee health and safety. Finally, the organization must conduct operations in compliance with applicable law and regulations, as well as in conformance with its own health and safety standard.

Appendix B (Informative)

B. Roles and Responsibilities (Section 3.1.3)

Each organization's top management needs to define roles, assign responsibilities, establish accountability, and delegate authority to implement an effective OHS management system. For the system to work effectively, each person within the organization needs to understand his/her roles and responsibilities.

This example is representative of a large organization. Because different organizations have different layers of leadership and management, these roles and responsibilities can be modified and aligned to fit within the organization's existing management system.

President, Chief Executive Officer, Owner

- Issues the organization's OHS policy and sets the example for OHS culture.
- Assume overall responsibility for the implementation of the organization's Health and Safety Policy and Occupational Health and Safety Management System (OHSMS) at all facilities under the organization's control.
- Assess information provided during a management review, and direct actions to continually improve the OHSMS and reduce risk in the workplace.

Executive Officers, Vice Presidents, and other Senior Leadership

- Provide visible guidance and operational leadership for implementing the culture and OHSMS consistently with the organization's policy in all facilities and operations.
- Assess information provided during a management review, and direct actions to continually improve the OHSMS and reduce risk in the workplace.

Directors, Managers, and Department Heads

- Communicate and implement the organization's OHSMS and its requirements to employees, visitors, and contractors.
- Direct individuals under your supervision, including but not limited to supervisors, regular and temporary employees, contractors, and other affected personnel to obtain any required OHSMS related training.
- Develop a process to maintain incident/illness prevention and health and safety programs.
- Develop a process to perform risk assessments.
- Determine OHSMS objectives and needs for units/departments are met.
- Incorporate OHSMS requirements and responsibilities into each appropriate job description, and ensure system requirements and expectations are communicated to each employee.
- (Engineering) Assess the health and safety impact of new processes and equipment, and incorporate appropriate controls.
- (Procurement/Contractor) Include OHS performance when evaluating and selecting suppliers and contractors.
- Maintain and improve programs for occupational health, hazardous materials management, radiation safety, general safety, incident/fire prevention, and biological safety.
- Conduct periodic health and safety audits (hazards, risks, and management systems) of work areas and/or facilities.
- Maintain and improve emergency action and disaster preparedness plans that provide clear roles and responsibilities for all personnel, in order to ensure familiarity and coordination between facility personnel and emergency responders.

Supervisors

- Implement the Occupational Health and Safety Management System and all other organizational safety practices and programs under your supervision or control.
- Require all staff members under your direction to successfully complete required safety and OHSMS training.
- Collect, recommend, and implement OHS improvements.
- Collect appropriate data per the OHSMS.
- Ensure there is a process in place to maintain workplaces and equipment under your direction that are safe, well kept, and in compliance with the Health and Safety Policy.
- Ensure procedures are developed for the safe use of hazardous chemical, physical, radiological, and biological substances.
- Conduct or arrange for risk assessments.
- Conduct incident investigations.
- Meet all health and safety needs for units/departments (e.g., engineering controls, training, personal protective equipment, and corrective measures including non-compliance items identified in health and safety audits).

Employees

- Comply with the organization's Health and Safety Policy and all other health and safety practices, programs, and procedures.
- Successfully complete required health and safety and OHSMS training.
- Participate in the OHSMS by reporting incidents or near misses, attending health and safety meetings, reporting problems and recommending improvements, and other related activities.
- Inform a supervisor or instructor of any safety hazards or system deficiencies in the workplace.

Health and Safety Department

- Advise management and employees about responsibilities regarding the OHSMS.
- Develop a process that prepares documents and guidelines for programs to ensure individual and organizational compliance with relevant health and safety laws, regulations, policies, and guidelines.
- Recommend programs and actions for compliance.
- Develop effective programs for occupational health, hazardous materials management, radiation safety, general safety, accident and fire prevention, biological safety, and disaster preparedness and emergency response.
- Provide guidance and technical assistance to supervisors and managers in departments and other work units in identifying, evaluating, and correcting health and safety hazards.
- Provide guidance and assistance in performing risk assessments.
- Provide training and materials assistance to ensure safe and healthful work practices.
- Conduct analyses of occupational incidents and injuries.
- Analyze injury and illness and monitoring data for trends.
- Monitor compliance with the OHSMS including health and safety statutes and regulations and organizational health and safety policies, programs, and guidelines.
- Note instances of noncompliance, and recommend improvements of the OHSMS.

Appendix C (Informative)

C. Encouraging Employee Participation (Section 3.2)

I. Introduction

Effective employee participation is fundamental to a successful OHSMS. Involving employees in decisions that affect their safety and health encourages them to participate in reducing risk and achieving a safe workplace. Including the expectation of employee participation in policies, processes, and practices can assure it is a regular practice.

Employee participation should be tailored to each organization's culture and business needs. Examples include: establishing joint labor-management committees, work groups, teams, or utilizing safety representatives or individual employees to facilitate employee participation in the OHSMS. Successful OHSMSs include sufficient direction, authority, resources, and training to effectively support employee participation in these activities. Employee participation should reflect the diversity of the workforce, including language, gender, disabilities, parttime workers, and contractors.

Plan-Do-Check-Act (PDCA) is the continual improvement foundation for ANSI/ASSE Z10. A core component of any continual improvement system is respect for people and engaging the workforce. The vast majority of opportunities for improvement are realized by addressing system deficiencies – not people. For example, lack of a safety through design process leads to health and safety issues in the workplace. Making safety improvements through a design process that involves employees is more effective and lasting than attempting to correct human error.

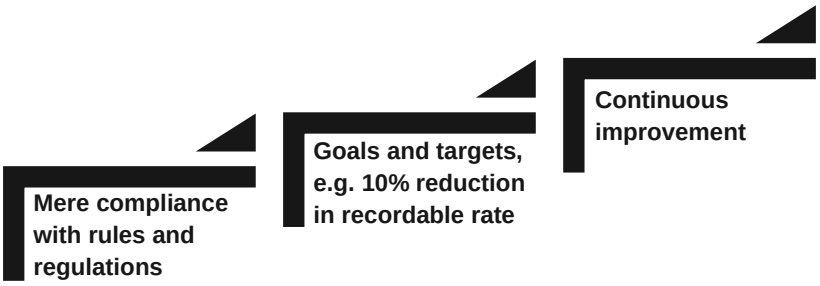
It is valuable to recognize the need to explain to employees the role they play in employee participation and why it is important. As an example, assigning someone to a safety committee who does not wish to participate will radically reduce the effectiveness of the committee and the employee's contribution to the committee. Proper training and orientation of employees asked to serve on such committees can be vital in shifting the employee state of mind from a "have to" state of mind to one of "want to" about participating in a committee or any other activity in the OHSMS.

II. Organizational Readiness and Effective Leadership

Organizational readiness is critical for ensuring effective employee participation. Organizational readiness refers to the degree of preparation undertaken by an organization to plan, promote, and support successful implementation of a large-scale change, such as adoption of the OHSMS. Research has shown that individual perceptions of organizational readiness largely shape the personal decisions of employees whether to resist, ignore, or support and actively participate in the change initiative. Key variables that often determine an employee's overall perception of organizational readiness include:

1. Trust in management (competence and motive),
2. Ability and willingness of the organization to alter policies and procedures as needed, and
3. Ability and willingness of management to commit needed resources.

Safety responsibilities should be recognized as a part of each job at every organizational level. While an effective OHSMS helps achieve desired outcomes, effective leadership will enable employees to actively participate and



help the organization succeed. It takes time and constant attention to develop the desired culture to support the business systems that lead to these outcomes.

It is common for organizations to have varying levels of readiness for increased employee participation. For example, organizational safety programs often develop in phases as shown in the graphic below.

Some companies may find it helpful to consider these phases for understanding their current state and what may be possible. For example, initially it may be difficult to obtain some types of employee participation. However, it will be easier to obtain improvements in the amount and quality of employee participation as an organization moves through these phases and comes to value its importance. It may also be helpful to develop a plan to increase employee participation over time.

Listed below are examples to help any organization determine their readiness for continual improvement in employee involvement. Note: this is different from a “gap” analysis in the planning stage of an OHSMS.

III. Employee Participation

It is important in any OHSMS system to include employee participation in the process. Employees who are actually performing the work tasks can contribute valuable insight from the ‘hands on’ perspective. Management should encourage employee participation in the design, implementation, and ongoing operation of the site’s OHSMS. Some examples of possible participation include, but are not limited to:

- Participation in hazard reviews and job safety analyses.
- Participation in incident and near miss investigations.
- Participation in health and safety committees.
- Participation in the development of training programs and procedures and in the safety training of other workers.
- Participation in teams conducting site risk assessments, inspections and audits.
- Participation in developing site training programs.
- Participation in health and safety inspections/audits.
- Employee participation in the selection of PPE; with explanation of when it is required, why it is required, how to use it, what its limitations are, and how to maintain it.
- Employee recognition for their involvement in safety programs and groups.
- Employee involvement in defining safe operating procedures and work practices for a task or job. This is an extension of the risk assessment process.
- Employees from one site paired up with employees from another plant to provide a “fresh eyes” approach.
- Employees communicating with or training other employees, often referred to as “peer level” training.
- Employees reporting unsafe conditions, tools or equipment, and practices.

- Mentoring of new employees, apprentices, and for on-site orientation.
- Providing safety feedback, using defined mechanisms, to employees of other employers on a multi-employer site.
- Helping identify hazards with strong emphasis on high risk jobs and the application of the hierarchy of controls (i.e. diagnostic work on live 440 volt panels).

To enhance employee participation in these areas, training may be needed to allow them to participate more meaningfully in the process. Examples of this type of training might include:

1. safety committee operations, duties, and responsibilities,
2. hazard identification and control principles, and
3. accident investigation procedures.

IV. Other Issues to Consider for Effective Employee Participation

Goals and Incentives:

- Goals and performance incentives should reflect financial and non-financial priorities that employees view as incentives. Employee participation can help to identify these incentives. Poorly designed incentives can cause adverse behavior, such as a reluctance to report injuries.

Time and Resources:

- All employees, including managers and supervisors, will balance time for safety activities with time devoted to other business demands. All of these responsibilities require attention, but not at the expense of the others.
- Adequate time and resources will be made available to all employees to perform their responsibilities under the OHSMS. For example, engineers need access to information and sufficient time to include safety considerations in workplace designs.
- Employees who are part of safety committees need sufficient time to perform their duties. Arrangements will sometimes need to be made to replace critical resources, to avoid resentment by a direct supervisor who may be left shorthanded during safety activities.
- For hourly or non-exempt employees, time spent on safety activities should be scheduled at convenient times, and time should be compensated to underscore the value of the contribution.
- Employers should ensure safety activities are accessible to persons with limited mobility or other disabilities.

Communications:

- Employee communications will reflect a balance of business messages, including frequent emphasis on safety.
- Some employees may be assertive in reporting problems or expressing safety concerns. Management will resist implementing transfers, demotions, discipline, or other action rather than addressing the issue. This could discourage other employees from participating.
- Communicate activities and successes to employees in a timely and meaningful way.
- Communication should be designed to reach all employees, including those who are illiterate or do not speak English.
- Departments often depend on input and information from other functional areas, but organizational boundaries sometimes make it difficult to communicate important safety information across functional areas. For example, engineering will work with production on process design, and production will work with purchasing on

hazardous materials. Management will facilitate communication between diverse functions such as purchasing, engineering, production, quality, insurance, and human resources.

- Encourage employees to report injuries and problems, and to respond to them promptly. Explain the cause for any delay or lack of response, to avoid the perception of apathy.
- Employees should be comfortable reporting hazards to their immediate supervisors.
- Mechanisms for communication between employers on the same site, including the host employer, will be clear to all.

V. Barriers to Participation

Effectively engaging workers to actively participate in health and safety requires thoughtful planning and implementation of processes/policies that will build an atmosphere of trust. Some factors that may act as a barrier to employee participation include:

- Disregarding the fact that all injuries and illnesses result from exposure to hazards.
- Perception by employees that management is primarily interested in disciplining "un-safe" acts without adequately addressing hazards and root causes.
- Personnel actions, such as promotions, compensation, demotions, disciplines, and re-assignments that are administered in such a way as to reduce or undermine the commitment to safety.
- Treating worker behavior as though it is a root or underlying cause rather than identifying hazards or system related causes.
- Administering a post-accident program, such as drug testing, in a way that discourages injury reporting
- Not implementing hazard recognition and control measures and/or ignoring the hierarchy of controls.
- Blaming employees with undue emphasis on discipline instead of implementing system changes.
- Uneven accountability – focusing only on the line/hourly worker and not addressing "behavior" of supervisors, senior management and corporate leadership.
- Employee perception that production takes precedent over safety and health.

Appendix D (Informative)

D. Planning – Identification, Assessment and Prioritization (Section 4)

The objective of the planning process in Section 4 is to identify and prioritize OHSMS issues. If an organization is implementing an OHSMS for the first time, the first step in a review is to perform a baseline or gap analysis that identifies differences between the requirements of this standard and any pre-existing management system. Once this is completed, the organization moves head towards identifying and prioritizing OHSMS issues based on all the management system elements – from Management Leadership and Employee Participation (Section 3) through Management Review (Section 7).

The process can be described as:

1. Determine all relevant OHS issues applicable to one's organization and operations. The purpose of this process is to assure, as far as practicable, that all OHSMS issues are identified so that they can be assessed and prioritized. OHSMS issues are hazards, risks, system deficiencies and opportunities for system improvement.
2. Prioritize the identified OHS issues to determine those that are most important to an organization.
3. Select objectives to improve the effectiveness of the management system and reduce the level of occupational health and safety risk.
4. Create implementation plans for OHSMS objectives that specify the tasks and responsibilities

The overall purpose of this phase of the Planning process is to understand and prioritize the most relevant OHSMS issues to the organization. This contrasts with more detailed risk assessment processes intended to define applicable hazard controls associated with specific equipment or processes.

Types of information that may be gathered in order to define relevant OHS issues are shown below. This is not meant to be an exhaustive list. An organization needs to review what is applicable to its operations.

Gather Information and Review Information to Identify OHSMS Issues

Information external to the workplace such as:

- External hazards
  - Weather related
  - Hazardous operations in close proximity
- External resources
  - Local fire department
  - Medical services
  - Hazardous materials response teams
- Regulations such as OSHA, MSHA, EPA, DOT, NRC, FDA and others* (see Key below)
- Codes
  - City, state, building, and fire
  - Other applicable city and state codes
- Standards
  - ANSI (American National Standards Institute)
  - Joint Commission on Accreditation of Healthcare Organizations
  - NFPA (National Fire Protection Association)
- External benchmarks/best practices
  - Other companies
  - Similar industries
  - Same sector
  - Insurance guidelines and recommendations
- External environment
  - Public perception
  - Product safety
  - Community relations

Information internal to the workplace such as:

- Existing management systems:
  - Management leadership and employee participation (Section 3)
  - Planning (Section 4)
  - Implementation and operation (Section 5)
  - Evaluation and corrective action (Section 6)
  - Management review (Section 7)
- Hazards & risks
  - Results of monitoring results and incident investigations
  - Results of risk assessments
  - Major loss sources
  - Contractor, maintenance, and other non-routine activities
- Existing hazard controls
  - Machine guarding
  - Fall protection systems
  - Ergonomic interventions
  - Noise enclosures
  - Fire suppression systems
  - Ventilation systems
- Resource allocation and organization
  - Human and financial resources
  - Employee participation
  - Effectiveness of working relationships between departments such as engineering, quality, procurement; and risk management
  - Accountability
- Recordkeeping / data systems
  - Injury / illness
  - Workers compensation
  - Compliance history
- Workplace inspections and audits

Key

- Mine Safety and Health Administration (MSHA);
- U.S. Environmental Protection Agency (EPA)
- Department of Transportation (DOT)
- Nuclear Regulatory Commission (NRC)
- Food & Drug Administration (FDA)

Assessment and Prioritization Factors

As stated above, the purpose of the review is to identify OHSMS issues that can be assessed and prioritized according to their importance to the organization. Multiple methods can be used to assess and prioritize OHSMS issues, and the method could be either qualitative or quantitative. Judgments made in priority setting should be situational and reflect the needs at a location at a given time. Priorities set should be periodically reviewed so as to reflect the current situation in an operation.

In assessing the significance of identified issues and opportunities to determine which should be given higher priority, several factors should be considered. Among these are the following:

- Issues with the greatest potential consequence, such as processes related to lockout, process safety, motor vehicle safety, confined space, or working at heights.
- Issues with the greatest prevalence.
- Issues related to the management system, such as organization, resource, participation or accountability other requirements. For example, supervisory accountability may need to be modified in order to improve incident reporting.
- Opportunities with the greatest potential for improvement, including opportunities for increasing employee participation that may assist in detecting previously unknown hazards as well as creating new approaches to hazard control.
- Situational factors such as a new or modified business process, acquisitions, recent serious incidents within and external to one's organization or new information.

Underlying causes should be a special focus of the assessment and prioritization process because addressing operational deficiencies without recognizing and addressing underlying causes may not provide any meaningful improvement for the OHSMS. These causes related to system deficiencies that contribute to hazards and risks may include the following:

- Human resource issues such as lack of coordination between the hiring process and job demands.
- Machine, process or equipment issues such as a lack of a formal process to assess guarding, maintenance, hazardous material controls or design.
- Management issues such as supervision, accountability, communication or participation.
- Methods issues such as rules, practices or procedures.

It is to be expected that some gaps and opportunities may suggest changes in organization, culture, resources, leadership style or behavior. For all levels of the organization to confront these observations with candor and openness is an important condition for improvement.

System and Operational Issue Examples

System reviews are focused on management system elements and are not specific to operations. An example of a system issue deals with employee involvement. An organization has an objective to increase employee involvement. As a part of its process for identifying OHSMS issues, it finds that although there are no barriers to employee involvement, there are no processes to actively encourage increased engagement. It uses the review to set new objectives for achieving greater employee involvement. Other examples include determination of resource levels and expertise; effectiveness of communication; and review of change management timelines and effectiveness.

For system issues, the intent is to identify and review system elements in areas that may be both within and outside the traditional context of health and safety programs and activities, but nonetheless affect occupational health and safety.

Examples of such systems include procurement, engineering, performance, and qualifications of employees carrying out OHSMS responsibilities, quality, environmental, and recognition systems. The organization should pay particular attention to systems that drive business performance, such as compensation or incentive systems, to make sure they are aligned with safety improvement. The positive or negative impacts of all of these systems on the effectiveness of the OHSMS are often profound.

An example of an operational issue that presents improvement opportunity over time may be chemical hazards, with the following theoretical scenario. An organization has a cleaning operation with a cleaner bath that is covered except when in direct use, where PPE and administrative controls are used. The operation maintains exposures well below PELs or TLVs®. Using the organization's management system, the procurement process identifies a safer cleaner that eliminates the need for PPE. Other examples of operational issues include ergonomic hazards, energy hazards, as well the characteristics of the materials, processes, and activities of the workplace or of neighboring activities.

Assessments conducted in this section are only for the purpose of prioritizing occupational health and safety issues and may not be complete or sufficient to determine appropriate hazard controls. (see Section 5 for more information on Hierarchy of Controls).

Appendix E (Informative)

E. Objectives/Implementation Plans (Section 4.3 and 4.4)

Managing Safety and Health: Planning and Setting Objectives

Establishing objectives is fundamental for integrating health and safety into any organization's business plan.

The SMART model is a useful tool to create objectives. Not all objectives will meet these criteria, but this model provides guidance in writing achievable objectives.

SPECIFIC	• Clearly define desired outcome or results by concretely and specifically answering: • Who is involved? • What do I want to accomplish? • Where are you now and where do you want to be? • When will it happen? • How – Identify requirements and constraints • Why – Specific reasons, purpose, or benefits • Example: "Increase daily production of widgets by 100" is more effective than a vague objective of "do your best to improve productivity."
MEASURABLE	• Establish concrete criteria to measure progress on attaining each objective to help you stay on track, reach target dates, and experience achievement that spurs continued effort required to reach objectives. • To determine if an objective is measurable, ask questions such as: How much? How many? How will I know it is accomplished? • Example: Telling employees to reduce customer wait time from 30 to 20 minutes is more useful than telling them to improve customer satisfaction.
ACTIONABLE	• Create related objectives and actions you can achieve. An objective should be translatable into actionable and concrete tasks people can accomplish. • Set challenging and purposeful objectives, but be realistic. • Example: Achieve an incident-free work environment. To evaluate whether the objective is actionable, ask: Can the objective realistically be carried out? How?
REALISTIC	• Make sure an objective is practical in terms of how applicable it is to a workplace, scope of the desired change, and its timeframes – or employees may not try to achieve them. • Example: Increase production by 50% next year without new resources. To determine if the objective is realistic, ask: Is it possible to achieve the goal? What forces help or hinder accomplishment?
TIME-ORIENTED	• Set realistic timeframes, including start and end dates and audit points or milestones to mobilize employees to achieve objectives. Without timeframes, employees may not have incentive to work toward objectives or, if unrealistic, employees may be discouraged. • Example: "Develop an electrical safety manual and distribute to all departments by April 30, 20XX " is more effective than an objective of, "write a safety manual" without a delivery date.

S-M-A-R-T Objective

Example of a SMART Objective: Implement a Lockout/Tagout Training Program for all 125 employees of XYZ, Inc. per OSHA 1910.147 by December 21, 20XX.

Using the **SMART** acronym, review the features of this objective that make it **SMART**.

- **Specific…** There is a clearly defined desired outcome that concretely and specifically answers who, what, when, why, and how.
- **Measurable…** Stating the total number of employees (125) being trained is an instance of concrete criteria.
- **Actionable…** The objective is written in an action-oriented, concrete manner.
- **Realistic…** The objective is practical in its scope and how it relates to the workplace, desired change, and timeframes.
- **Time-oriented…** A specific timeframe is identified – by December 21, 20XX.

Example of an objective that is NOT SMART: We will develop a lockout/tagout program.

Page +1 contains a list of example objectives from a hypothetical company.

An example of an implementation plan form can be found on page +2.

ABC Corporation's Objectives

Below are examples of objectives from a hypothetical company which apply to a variety of areas of an OHSMS

OBJECTIVES	TIMELINE	RESPONSIBLE AUTHORITY
HAZARD COMMUNICATION		
• Distribute approved policy	Q1-04	RM-CGL
• Review site specific SOPs for policy compliance	Q2-04	RM-SS
• Train on policy	Q1-04	RM-SS
• Review chemical approval process	Q3-04	RM-ML
• Install monitors for automated MSDS availability in operations	Q2 & Q3-04	RM-ML
PROCUREMENT		
• Distribute approved policy	Q1-04	RM-CGL
• Train on policy and procurement procedure	Q1-04	RM-SS
• Distribute safety requirements to be included in standard contracts	Q1-04	RM-ED
TRAINING		
• Improve training system based on last year's evaluation	Q4-03	RM-SS
• Review training schedule	Q4-03	RM-SS
INSPECTION/TESTING		
• Develop matrix for all required safety inspections/test	Q1-04	RM-CGL
• Determine who is primary inspection authority	Q1-04	RM-CGL
• Develop inspection test criteria	Q1 to Q4	RM-ALL
INCIDENT INVESTIGATION PROCEDURE		
• Determine who will be trained in Incident Investigation	Q1-04	RM-CGL
• Train managers in Incident Investigation	Q1 to Q2-04	RM-SS
• Review Incident Investigation report form	Q1-04	RM-SS/ED
• Develop causal analysis system	Q3-04	RM-SS/ED
• Implement new department "on line" reporting	Q2-05	RM-SS/ED
LOCKOUT/TAGOUT		
• Introduce new policy	Q4-03	RM-CGL
• Review site SOPs for policy compliance	Q1-04	RM-SS
• Train employees in new policy	Q2-04	RM-SS
• Review lockout methods/locations	Q1-04	RM-ED

OHSMS Implementation Plan

Department: _____ OHSMS Issue: _____

Objective(s) addressed:

_____

Hazard Reduction/Productivity/Cost Savings/Compliance/Other Benefit:

_____

Overall project metric and frequency of measurement:

_____

_____

Task	Responsible Party	Resources	Completion Criteria	Target Completion Date	Actual Completion Date

Project Approval: _____

Implementation Plan/Completion Form (Page 2 of 2)

Significant Issue(s) Covered: _____

Results Summary:

_____

_____

_____

Benefits Achieved: _____

_____

_____

_____

Reviewed by:

_____ Date: _____

_____ Date: _____

_____ Date: _____

Appendix F (Informative)

F. Risk Assessment (Section 5.1.1)

Risk assessment is the process to determine the level of risk based on the likelihood the hazard will cause an injury or disease, and the severity of the injury or disease that may result. When a hazard is identified and discussion takes place concerning its potential for harm and the probability an injurious incident or exposure can occur, a risk assessment has been made. In doing so, for the simpler and less complex hazards and risks, the assessment may be based entirely on knowledge and experience. Risk assessments have been an integral part of the practice of safety for many years.

Risk assessment outcomes can be used to understand the relative levels of risk in the workplace and the importance of identifying strategies to reduce risk. It is generally acknowledged that zero risk is unattainable and that some residual risk always remains. "Safe" is viewed as having reached a level of acceptable or minimal residual risk.

Task vs. Hazard Based Risk Assessment

Risk assessment commonly involves either a task-based approach or a hazard-based approach. The task-based approach begins with a job, breaks it down into discrete tasks, identifies hazards associated with each task and then assesses the risk. A "What-If" analysis is performed on human behaviors involved with the task, to include foreseeable interactions with machines, the work site, and environment, and possible failures, malfunctions, or deficiencies. This analysis anticipates adverse outcomes and their most probable severity. Alternatively, a hazard-based approach begins with the hazardous characteristics of the materials, worksite, or environment themselves, and then considers possible activities that may be affected by them. Occasionally a combination of both task-based and hazard-based approaches is used. For further details see *Advanced Safety Management* by Fred Manuele[2], or *A Strategy for Assessing and Managing Occupational Exposures*, 3rd edition, 2006.[8]

The likelihood of an injury is related to the number of people exposed to a hazard, the frequency of exposure, the controls in place at the time (assessed according to the hierarchy of controls), and the likelihood for error or process/ machine malfunction. Human behavior is highly variable and often situation-specific. Controls which rely on human behavior and error avoid to avoid error are less reliable.

The risk assessment process can also be used at a systems level. (Section 4.0, "Planning," in the standard). Taking a more strategic view, management may consider loss control data, accident trends, and the potential for a catastrophic event based on the nature of the activity itself. Likelihood and severity in this case would be based upon overall factors such as the capabilities of process, engineering, procurement, employee training and development, and the age of fixed assets including machinery. In the strategic view, risk control may also include consideration of alternative business activities, to replace those with a higher level of risk.

Relationship to the Standard

Risk assessment is essential to an organization's OHSMS. For example, risk assessments can be performed as part of an organization's review and prioritization process (Sections 4.1.E and 4.2) and Design Review and Management of Change process (Section 5.1.3). Determining the level of risk is critical throughout the OHSMS, including the

Corrective and Preventive Action (Section 6.4.B), Procurement (Section 5.1.4) and Contractor (Section 5.1.5) processes.

Risk assessments may be done at different levels of detail depending on their purpose. Risk assessments that are done as part of Design Review and Management of Change are done to define controls associated with specific processes or equipment. These risk assessments are generally more detailed and are equipment- or process-specific. Risk assessments may be used at a systems level during Planning to prioritize OHS issues.

Employee participation is important to get accurate risk assessments, as those closest to the operations usually have the best knowledge of the work methods, tasks, breakdowns or process troubles.

Definitions

Whether the process is informal or more complex, agreement has to be reached on the meanings of the terms used. For this Appendix, the following definitions apply.

Hazard: A condition, set of circumstances, or inherent property that can cause injury, illness, or death.

Exposure: Contact with or proximity to a hazard, taking into account duration and intensity.

Risk: 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 (See Appendix E).

Probability: The likelihood of a hazard causing an incident or exposure that could result in harm or damage—for a selected unit of time, events, population, items or activity being considered.

Severity: The extent of harm or damage that could result from a hazard-related incident or exposures.

Risk assessment: Process(es) used to evaluate the level of risk associated with hazards and system issues.

Hazard Analysis and Risk Assessment Guide

For many workplace hazards and their associated risks, knowledge gained through education and experience will lead to effective controls to attain an acceptable risk level. For the more complex situations, gathering a team of knowledgeable personnel who are familiar with the work is usually necessary. Reaching group consensus on a risk assessment is highly desirable.

A general guide follows on how to make a hazard analysis and how to extend the process into a risk assessment.

Whatever the simplicity or complexity of the hazard/risk situation, and whatever the choice of the risk assessment method, the following process is recommended.

- Assure Management commitment, involvement and direction (an absolute).
- Select a risk assessment team, including employees with knowledge of jobs and tasks.
- Establish the analysis parameters.
- Select a risk assessment technique.
- Identify the hazards.
- Consider failure modes.
- Assess the severity of consequences.
- Determine occurrence probability, prominently taking into consideration the exposures.
- Define the initial risk.
- Make risk acceptance or non-acceptance decisions with employee involvement.

- If needed, select and implement hazard avoidance, elimination, reduction and control measures.
- Address the residual risk.
- Make risk acceptance or non-acceptance decisions with employee involvement.
- Document the results.
- Follow-up on the actions taken.

The Goal to be Achieved

The goal of the risk assessment process including the steps taken to reduce risk is to achieve safe working conditions with an acceptable level of risk. There is no single, absolute definition for acceptable risk, and it will likely vary by organization. In general terms, acceptable risk is risk that has been assessed and controlled to a level that is tolerated by the organization taking into consideration legal obligations, internal OHS policy and employee's input when applicable.

Obtaining zero risk levels is generally impossible. There will always be residual risk if an operation continues. Residual risk is defined as the risk remaining after preventive measures have been taken through the risk assessment process. No matter how effective the preventive actions taken, there will always be residual risk if an activity continues. If the residual risk is not acceptable, the process outlined above should be applied again. Even when the residual risk is acceptable, management should consider taking additional risk reduction measures if the cost is reasonable, particularly if doing so resolves employee concerns.

Hazard Analyses and Risk Assessment Techniques

A number of risk assessment techniques have been developed such as those described in ANSI/ASSE Z690.3–2011 Risk Assessment Techniques. The method you choose will depend on the complexity of your situation.

No single risk assessment technique will apply in all situations. An organization will need to select an appropriate risk assessment technique for the task, hazard, equipment or process to be assessed. The following examples of risk assessment techniques cover a wide range of occupational health and safety issues; however, they would not be appropriate for many occupational health hazards such as noise and chemical exposure for example. In these situations, risk would need to be assessed using specific noise or chemical exposure monitoring assessment techniques.

It should be noted that the science behind determining the relationships between hazard, exposure and risk has not sufficiently evolved to be precise or predictive. There are a number of risk assessment models using quantification. These should be viewed as relational rather than exact because of the challenge of scientific validation. However, these methods can be useful in setting priorities and demonstrating progress over time.

Example 1: Brainstorming

Group discussion or brainstorming by employees who perform a task can be very effective in identifying hazards, risks and solutions.

Employees of a painting contractor regularly use extension ladders to perform work. A decision is made to perform a risk assessment on this activity. Management forms a team including painters who frequently use ladders. The team lead schedules a meeting for the risk assessment. At the meeting, the team lead discusses the objectives and ground rules for the meeting and facilitates a free-flowing discussion about hazards, risks and controls for ladder use.

The team agrees that working from a ladder poses a high risk because severe injury could result from a fall. Ladders are used every day so exposure to the hazard is high. Many controls are in place to minimize this risk including training, written procedures and the use of stabilizer bars at the top of the ladder to help prevent sideways movement.

The team decides that stabilizing a ladder on sloping ground is especially risky. Using shims and a "buddy" to hold the ladder (as was commonly practiced within the company), is not an adequate control. A better solution such as automatic ladder leveling devices is needed to bring the risk of falling to an acceptable level. The meeting minutes are recorded and the meeting recommendations are provided to management.

Example 2: Checklist

Using a checklist is a simple form of performing a risk assessment, and is usually based on a more comprehensive risk assessment performed of a similar operation or business. A checklist can be a useful tool to identify hazards, assess risk and select or evaluate potential controls. It is essential that the checklist used is appropriate for the work being performed. (Note: Typically, experts use risk assessment to develop the checklist, which is then used as a risk assessment 'tool' for supervisors and workers to assess risk in the workplace).

A small paving company is in the process of implementing an OHSMS and decides to conduct a risk assessment on the upcoming repair of a section of road in a rural area. The supervisor leading the risk assessment had previously worked for other paving companies and finds several work zone safety checklists by searching the internet. Checklists are a useful method of risk assessment because they are relatively easy to implement and most are the result of risk assessments performed by experienced experts in the field.

The checklists describe the necessary signage, including height, size, legibility and use of retro reflective materials to ensure that a similar color will be displayed in day or night conditions. The checklist also covers items such as the use of flaggers, procedures, safety apparel, STOP/SLOW paddles and training required.

The supervisor develops a plan based on the checklists and meets with his crew to review the safety plan and solicit input. The crew customizes the checklist to fit the specific circumstances of the job. The supervisor then uses the checklist to assess the work site as the crew is setting up and periodically as the work progresses and working conditions change.

Enhancing the Value of Checklists:

Checklists are a simple, but powerful, method of performing risk assessment when used properly.

Checklists should always be accompanied by an explanation of "why" it is important and "how" to use it. When used to promote active employee participation and feedback, checklists can highlight hazards or risks not foreseen by the creators of the checklist. In such cases, a modified checklist should be developed to assure that all hazards and risks have been properly addressed. Getting the most out of a checklist risk assessment involves:

- Explain why
- Explain how
- Promote employee participation and open communication
- Continually improving / expanding checklists to assure all hazards and risks are covered

Example 3: Consequence/Probability Matrix

When multiple hazards are associated with a work tasks, a more structured risk assessment approach may be used.

A currently installed grinding machine is to be used on aircraft parts and will need a risk assessment. The aircraft parts are aluminum. Initial inspection shows a floor stand grinder with a 12” wheel. The machine has a manual speed adjuster. The point of operation is 42” above the floor. The wheel guard on the right side is missing two fasteners and the tongue guard is about 2” from the wheel, apparently because of wheel wear. The work rest is 1” from the wheel. Shields are on the machine but are filthy and pushed back. The machine has apparently been moved because the bolts lagging the machine to the floor are missing. The ventilation system has some apparent seam leakage. All who enter the shop must wear safety glasses. When grinding, the workers wear leather gloves. Parts are delivered in a bin sitting on the floor.

Because multiple hazards are associated with this equipment, the organization decides to use a traditional risk assessment matrix. The organization begins this risk assessment by listing all the hazards associated with this task. The following is a list of hazards for this grinding example. To complete the risk assessment, each hazard must be judged on the basis of likelihood of injury and potential severity; to do this you would use a risk assessment table (see example below). In this example, risk is assessed in the absence of controls. This helps to highlight the need for corrective and preventative actions.

Hazard	Likelihood	Severity	Risk
Struck by wheel fragments			
Hand contacts wheel			
Hand / wrist CTD			
Eye injury			
Struck by part			
Struck by falling grinder			
Back pain from bending			
Dust explosion			
Noise			
Overall Risk			

Risk assessment tables can have numbers assigned to indicate the level within each category and to calculate a quantifiable risk score.

Example 4: Risk Assessment Matrix

A risk assessment matrix provides a qualitative method to categorize combinations of indicators for occurrence probability and severity of outcome, thus establishing risk levels. A matrix provides an effective visual tool and helps in communicating with decision makers when deciding on the actions to be taken to reduce the risk. Risk assessment matrices can also be used to compare and prioritize risks, and to effectively allocate mitigation resources.

Countless probability, severity, and frequency of exposure exhibits and risk assessment matrices appear in the literature. The meanings of the terms used in them have wide variations. That reflects the differences in the perceptions people have of risk.

Since a risk assessment matrix is a decision tool, it is important that an organization agrees on the definitions and terms to be used, the levels of risk that require reduction and those that are acceptable. When developing the risk assessment matrix, remedial action and acceptable risk levels must be assigned to each risk category in the matrix so that decisions can be made in a logical and consistent manner.

Example of a Risk Assessment Matrix Combining Event Probability and Severity Indicators with Risk and Action Levels.

Example of a Risk Assessment Matrix				
	<--------- Severity of Injury or Illness Consequence -------->			
Likelihood of OCCURRENCE or EXPOSURE For selected Unit of Time or Activity	NEGLIGIBLE	MARGINAL	CRITICAL	CATASTROPHIC
Frequent	MEDIUM	SERIOUS	HIGH	HIGH
Probable	MEDIUM	SERIOUS	HIGH	HIGH
Occasional	LOW	MEDIUM	SERIOUS	HIGH
Remote	LOW	MEDIUM	MEDIUM	SERIOUS
Improbable	LOW	LOW	LOW	MEDIUM

Likelihood:

Frequent: Likely to Occur Repeatedly

Probable: Likely to occur several times

Occasional: Likely to occur sometime

Remote: Not likely to occur

Improbable: Very unlikely – may assume exposure will not happen

Severity/Consequence:

NEGLIGIBLE: First Aid or Minor Medical Treatment

MARGINAL: Minor injury, lost workday accident

CRITICAL: Disability in excess of 3 months

CATASTROPHIC: Death or permanent total disability

Risk Level:

LOW: Risk Acceptable, Remedial Action Discretionary

MEDIUM: Take Remedial action at appropriate time

SERIOUS: High priority remedial action

HIGH: operation not permissible

Note: These definitions are provided for illustrative purposes only and each organization will need to define these terms for their own process.

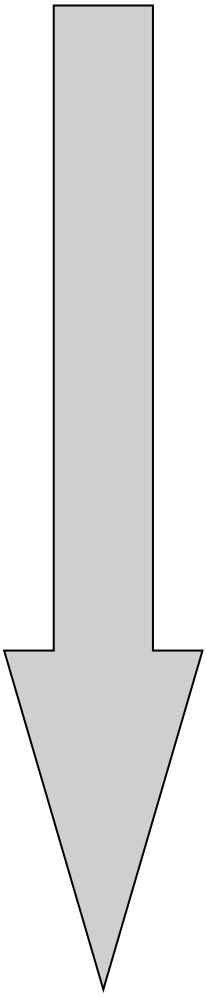
Appendix G (Informative)

G. Hierarchy of Control (Section 5.1.2)

This hierarchy is intended to provide a systematic approach to eliminate, reduce, or control the risks of different hazards. Each step is considered less effective than the one before it. It is not unusual to combine several steps to achieve an acceptable risk. The types of hazards employees are exposed to, the severity of the hazards, and the risk the hazards pose to employees should all be considered in determining methods of hazard elimination or control.

Hierarchy of Health and Safety Controls

Most Effective



Least Effective

CONTROLS	EXAMPLES
1) Elimination	• Design to eliminate hazards, such as falls, hazardous materials, noise, confined spaces, and manual material handling.
2) Substitution	• Substitute for less hazardous material. • Reduce energy. For example, lower speed, force, amperage, pressure, temperature, and noise.
3) Engineering Controls	• Ventilation systems • Machine guarding • Sound enclosures • Circuit breakers • Platforms and guard railing • Interlocks • Lift tables, conveyors, and balancers
4) Warnings	• Signs • Backup alarms • Beepers • Horns • Labels
5) Administrative Controls	<u>Procedures</u> • Safe job procedures • Rotation of workers • Safety equipment inspections • Changing work schedule <u>Training</u> • Hazard Communication Training • Confined Space Entry
6) Personal Protective Equipment	• Safety glasses • Hearing protection • Face shields • Safety harnesses and lanyards • Gloves • Respirators

Appendix H (Informative)

H. Management of Change (MOC) (Section 5.1.3)

The objective of a management of change process is to minimize the introduction of new hazards and risks into the work environment when changes are made such as in technology, equipment, facilities, work practices and procedures, design specifications, raw materials, organizational staffing changes, and standards or regulations. Applying the change analysis concept is essential within a management of change process. A change analysis is to assure that:

- The hazards and risks that may arise are identified and assessed (e.g. risk assessment) and that appropriate control measures are taken.
- New hazards created are controlled to an acceptable risk.
- Previously resolved hazards are not negatively impacted- increasing the risk.
- The OHSMS is not negatively impacted.

Any management of change process follows a Plan-Do-Check-Act model of continual improvement. The key factor is to identify the level of change which triggers the MOC process. When changes are overlooked, additional hazards and risks may be introduced into the workplace.

Developing a Management of Change Process

An administrative procedure should be written to communicate what the management of change system will encompass and how it is intended to operate. The system should be designed to fit the organization's structure, level of risk, culture, and work force. The system may establish multiple levels of management of change review and procedures depending upon the scope of the change. A major facility or process change may trigger comprehensive review and procedures whereas a minor equipment rearrangement or method change may require minimal review. Depending upon the magnitude and potential consequences of the change the procedure may include:

- Defining the purpose of the management of change system.
- Establish organizational responsibilities and accountability levels; including who will participate in review and the scope of their review
- Specifying the criteria that are to trigger the initiation of formal change requests.
- Establish a process for change requests, and specify the change request form to be used.
- Assign responsibility for acceptance or rejection or modification of the change request, in accord with the results of the change analysis, and include a management of change approval form.
- Outline a method to determine actions needed as a result of the management of change process (e.g., additional training of operators and maintenance workers; revision of standard operating procedures and drawings; communications to employees and contractors; modifying equipment; updating emergency plans).

After changes are made a final review should take place before startup of operations.

When to Initiate the Management of Change Process

The hazard and risk complexities of an organization will dictate when a management of change exercise should be triggered. The list below indicates activities which should be considered when determining when to initiate a management of change process.

- Non-routine and unusual work that will change a process of equipment (other than replacement in kind).

- A change in high risk exposures such as sources of high energy or highly toxic materials.
- Substantial equipment replacement work is to take place.
- New or modified technology is introduced, including software.
- Modifications are made in equipment, facilities, or processes.
- New or revised work practices or procedures are introduced.
- Design specifications or standards are changed.
- Different raw materials are to be used.
- Modifications to existing health and safety devices and equipment will be made.
- Significant changes to the site's organization.
- Staffing changes will be made, requiring a review of skill levels.
- A change in the use of contractors (e.g. introducing contract labor) who service vital processes or equipment is made.
- Significant changes in existing resource allocation.

Management of Change Request Form

When creating a Management of Change Request Form, consideration should be given to include as much of the following as needed:

- Name of person making the request;
- Date of request;
- Department, section, or area;
- The equipment, facility, or process affected;
- Brief description of the proposed change and what it will accomplish;
  - Why the change is proposed
- Potential performance, safety, health, and environmental considerations;
- Titles for personnel who need to review the change and space to enter their names;
- Effect the change may have on standard operating procedures, maintenance, and training, etc.;
- Space for reviewers to enter special conditions or requirements;
- Approvals and authorizations, and
- Routing indicators or provisions for copies to be sent to personnel responsible for training and updating operating procedures, drawings, etc.

A sample Management of Change Request Form follows. The form should be tailored to suit the organization's needs. The organization should consider saving the form electronically to allow flexibility when descriptive data and comments are added.

Management of Change Request Form

General Information

Date _____ Originator _____ Department _____

Sent to: _____

Equipment, facility or process affected _____

Urgency of change: ☐ Emergency ☐ Priority ☐ Routine

Basis for the Change (Check those applicable)

☐ Improved safety—risk reduction

☐ Improved performance—efficiency

☐ Pollution prevention—waste minimization

☐ Essential to operation

☐ Model change or change in production operations

☐ Other Specify _____

Description of Proposed Change and Potential Hazards

Summarize the basis for the proposed change and any potential safety, health, or environmental impacts from the proposed change. Describe how the change will affect SOPs, maintenance, training, etc. State the change start and end dates.

_____

_____

_____

Approved or disapproved by:

Name and date _____ Organization/Position _____

_____ _____

_____ _____

Comments _____

_____

_____

Appendix I (Informative)

I. Procurement (Section 5.1.4)

The purpose of this appendix is to provide guidance on preventing the introduction of hazards associated with purchasing products, tools and equipment.

Procurement processes vary depending on the size and complexity of the operational needs of an organization. OHSMS issues can arise when persons without safety or process knowledge are tasked with purchasing decisions. Separate protocols may exist for specific purchases or items. The organization should establish controls over how new products, tools, and equipment are introduced into the work environment. This should include normal purchasing channels as well as other sources such as samples brought in by vendors.

Several steps are essential for developing an effective procurement process:

- Identify hazards associated with the proposed purchase.
  - Review material safety data sheets (SDS) for hazards and compatibility with existing materials, products and processes.
  - Evaluate the physical/mechanical compatibility of the proposed purchase(s) with existing materials, equipment and processes.
- Ensure review by knowledgeable person before purchase is initiated.
  - Consider the hierarchy of controls.
  - Solicit employee input.
  - Review should include but not be limited to health, safety, environmental, waste disposal, and human factors.
- Analyze the capabilities and limitations of the employees who will be using the proposed purchase.
- Develop purchase specifications to communicate the organizations health and safety requirements to suppliers and users.
- Incorporate cost effectiveness considerations which may include value of warranties, costs of maintenance and operation, employee training, and end of life/disposal costs.
- Include occupational health and safety background check of the vendor or supplier in previous interactions.
- Gather input from the employees using the new product, tool or equipment.
- Review of any incidents associated with the new purchase.
  - Near misses
  - Unintended consequences
- Evaluate how well the new purchase contributes to overall goals of the organization.
- Compute financial consideration which may include return on investment, cost benefit analysis and/or other methods.

Organizations may want to negotiate trial periods for new products before committing to long term purchasing agreements. Experience gained during procurement of any product, tool or equipment should be communicated so that it can be applied to the future procurement activities.

Appendix J (Informative)

J. Contractor Safety and Health (Section 5.1.5)

The purpose of this appendix is to provide organizations guidance with respect to the exposures and control measures required to maintain the business by contracting for expertise and/or services. Many organizations rely on contractors to accomplish specific specialized tasks or to extend their workforce. Contractor relationships vary widely ranging from fully-integrated to completely independent workers.

Examples may include the following:

- Temporary workers contracted through an agency who perform the same service or production functions as full time employees.
- Contracted services performing routine, essential support functions such as a logistics provider who drives forklifts and stocks parts for an assembly line.
- Maintenance, janitorial or guard services.
- Workers who perform occasional but routine on site services for multiple clients, such as waste haulers or lawn care services.
- Onsite workers engaged in limited or one-time projects such as independent electricians, plumbers, or financial auditors.
- Field sales agents or service representatives who work out of their own office.
- Contractors who perform independent self-directed services such as new building construction.

An effective OHSMS includes the oversight of all activities onsite performed by contractors. Serious consideration will be given to the risks that contracted services can introduce to the business environment.

The selection of service providers, consultants and/or construction companies requires careful consideration. The first step is to understand the scope of work, risk exposures and specific activities. After the scope is defined communicate the risk exposures and develop sufficient performance and safety expectations. A number of service providers should be interviewed to determine the best fit and lowest risk to the organization. Final selection criteria should include acceptable risk exposure. Pre-job planning for a successful start-up is often critical for continued operational success.

Generally, the risks associated with outsourcing services can be described into three general categories; examples are as follows:

- **Low Risk:** office janitorial, human resource, financial and other management and/or administrative services
- **Medium Risk:** basic facility maintenance, landscaping/maintenance, chemical waste handling/waste management, laboratory services
- **High Risk:** major capital improvement programs, new construction, highly hazardous waste removal, operations and maintenance of highly hazardous chemical and/or raw material industrial processes

Organizations should be aware of the safety, health and environmental hazards and exposures inherent to their business process. Maintaining incident free work environments are important to businesses because they eliminate losses by preventing injuries, property damage, operational disruptions, schedule delays and wasted resources. Ensuring that all levels of service providers understand the organization’s exposures as-well-as the hazards and risks presented by the service provider and are clearly understood by each party prior to mobilization.

The following risk-based examples are provided to demonstrate the types of exposures that service providers may face while entering a facility. In addition, the examples will provide guidance on the type and nature of controls organizations should be aware of.

Organizations such as this should consider the following measures to control losses associated with onsite activities related to low risk operations.

- Contracts language specific to service provider expectations
- Appropriate Insurance coverage
- Reference checks
- Development and submission of Site-Specific Safety, Health and Environmental Plan
- Certificates of Insurance (submitted to the organization by service provider)
- Service provider permits to handle, transport and dispose of hazardous material
- Orientation to organization's facilities and processes
- Ongoing monitoring of activities

Organizations such as this should consider the following measures to control losses associated with onsite activities related to medium risk operations.

- Appropriate insurance coverage providing continuous coverage for the specific type of identified hazards.
- Contract language for pre-qualification of high hazard services.
- Documented previous experience of service provider and key project management team.
- Completion of hazard analysis for all onsite activities and laboratories safety and environmental plan demonstrating compliance.
- Development and submission of Site Specific Safety, Health and Environmental plan.
- Organizational audits of environmental, hygiene, safety and fire prevention programs as defined by the service provider's site specific plan.
- Review and audit of contractor/vendor's security and substance abuse programs.
- Establishment of an approved chemical list for laboratories and approved janitorial chemical supply list of environmental safe/green products.
- Established procedures for logistics to receive, store, deliver, inventory and properly disposal laboratory supplies.
- Provide information for the contractor to prepare a proposal. For example, it may be useful conduct an assessment with the contractor to clarify performance expectations.
- An interview between the organization and the service provider will determine how the relationship will be managed and sustained.

Organizations should consider the following measures to control losses associated with onsite activities related to high risk operations:

- Appropriate insurance coverage providing continuous coverage for the specific type of identified hazards.
- Documented experience on similar projects.
- Prequalification process to review past performance with emphasis on leading and lagging indicators, citations, 300 logs, insurance loss runs and safety, health and environmental program content and staff.
- Experience Modification Rate (EMR) evaluation and establishment of "not to exceed" EMR ratings limits.

- Development of detailed contract specifications indicating specific submission requirements including identification of scope of work, related risks and hazards, and the identification of the appropriate elements of control.
- Development and submission of a Site-Specific Safety, Health and Environmental Plan to include provisions for the oversight of subcontractors.
- Thorough risk and hazard assessments of all onsite activities.
- Crane and Equipment safety requirements, permits and procedures.
- Implementation of the Construction Industry Institute “Zero Incident Techniques.” • Active engagement of organization’s staff during the construction process.
- Audits focusing on program management, regulatory compliance and leadership/cultural elements.
- Establishment of an “approved” contractor list.
- Assigning a qualified on-site safety representative.
- Formalized recognition programs based upon leading and lagging indicators.
- Mentoring programs to assist contractors with safety program development.
- Integration of contractor work with worksite control measures.
- Management of fatigue.

Appendix K (Informative)

K. Incident Investigation (Section 6.2)

Incident investigations should be used as a tool to prevent similar incidents from occurring. They also should be used to capture non-injury incidents (“near-misses”) that could have resulted in a work-related injury or illness. In this way, they are used to prevent an injury from happening.

The purpose of any incident investigation is to identify underlying causes and contributory factors, and recommend solutions that address these causes and factors.

Attached is an example incident investigation form. An organization may choose to use this form or a variation based on its size, operations, or services. Organizations may select data from the example form that are applicable to their organization and provide it the greatest value as it conforms to this Standard. The data included on the example form is designed to help find not only the most important underlying cause, but also the contributing factors.

The following is an example of how to make the form more applicable to an organization: the recommendations and recommended corrective actions may be included in an organization’s corrective/preventive action process rather than included in the incident investigation form. However an organization does it, specifying and implementing recommendations based on the results of an incident investigation are the key objective.

INCIDENT INVESTIGATION FORM

Investigator:

Name:	Title:	
Manager Name (If different than Investigator):		
Other participants:		

Part I: Injury Data

1. Name of Injured	2. Work Phone	3. Ext.
4. Usual Occupation	5. Date of Birth	
6. Employee Status	7. Employee #	
8. Hire Date	8a. Occupation at Time of Incident	
9. Date/Time of Injury	10. Nature of Injury/Diagnosis	
11. Date/Time Reported	12. To Whom	
13. Hours Worked Prior to Incident:	14. Amount of time on this Job:	

14 Severity of Injury:

☐ Fatality ☐ Lost Workdays ☐ Restricted Workdays ☐ Medical Treatment
☐ First Aid ☐ No Treatment ☐ Other (Specify): _____

15. OSHA Recordable q Yes q No	16. Rationale:

Part 2: Medical Treatment Data q Not Applicable

17. Name of Treatment Facility	18. Phone
19. Date/Time at Facility	20. Address

Part 3: Incident Data

21. Type of Incident

☐ Non-injury illness incident ☐ Injury ☐ Illness ☐ Impact ☐ Property Damage

22. Location

23. Personnel Involved

23. Equipment Involved (Type, Model)

24. Other Items Involved (Tools, etc.)

Part 4: Incident Description (Supervisor/Witnesses/Employees with Insight) ☐ Not Applicable

25. Date/Time of Interview		26. Name	
27. Work Phone	28. Ext.	29. Usual Occupation	30: Employee #

31. Description of events (leading to, during, or after incident):

_____

_____

_____

_____

32. Date/Time of Interview		33. Name	
34. Work Phone	35. Ext.	36. Usual Occupation	37. Employee #
38. Description of events (leading to, during, or after incident): _____ _____ _____ _____			
39. Date/Time of Interview		40. Name	
41. Work Phone	42. Ext.	43. Usual Occupation	44: Employee #
45. Description of events (leading to, during, or after incident): _____ _____ _____ _____			

Part 5: Possible Causes (Events/Conditions that may have contributed to the incident)

46. Describe:

a. Equipment _____

_____

b. Tools (including PPE) _____

_____

c. Environment _____

_____

d. Procedure _____

_____

e. Personnel _____

_____

Part 6: Recommended Corrective Actions

47. Describe Recommended Corrections Actions/Actions Taken:

_____

_____

_____

_____

Part 7: Recommendations

Recommendation	Originator	Accepted/ Rejected	Actions or Rationale	Completion Dates
1.				
2.				
3.				
4.				
5.				
6.				

Part 8: Management

Responsible/Approving Department Manager/Process Owner	
Name:	Title:
Signature:	Date:
Investigator's Signature:	**Date:**

When complete, send to:

☐ _____

☐ _____

Send copies to:

☐ _____

☐ _____

Appendix L (Informative)

L. Audit (Section 6.3)

A successful OHSMS requires on-going review and evaluation of the effectiveness of the management system through periodic audits. Audit processes need to be established to direct the planning and implementation of the internal audit activities to achieve the overall objectives of the audit program. In addition, each individual audit should be based on defined objectives, scope and criteria. As a part of each audit, information should be collected, and processes reviewed to evaluate the elements of the management system being evaluated.

The preparation of an audit plan is valuable to both the auditor(s) and those being audited. The plan should identify the objectives, criteria, schedule (locations, times, and duration of audit activities), scope, methods, roles and responsibilities as well as the information available to the auditor(s).

During the audit, it's important to collect objective evidence that helps demonstrate conformance to the OHSMS requirements as well as the overall performance of the management system processes.

Auditors should collect and review the information relevant to their assignments and document the information pertinent to their findings. The use of audit checklists or protocols may be helpful for guiding the activities and recording information. Care should be taken that the use of audit checklists and forms does not inappropriately limit the extent of the activities.

What follows is an example audit protocol with suggestions for the type of objective evidence that might be examined while conducting the OHSMS audit. The degree of detail in this table may not be appropriate for every organization; however, but it may be useful as a template that can be modified to match the culture and needs of an organization. For example, larger organizations may want to add entries to facilitate the use of this table by multiple auditors.

This example is for an organization that developed documentation for nearly every aspect of its OHSMS. This may not be appropriate for other organizations. Specific documentation requirements can be found in section 5.4.

How to read the sample audit protocol:

1. OHSMS Section: A reference to the Z10 OHSMS element(s) that are included within the scope of the audit.
2. Potential Sources of Objective Evidence: The evidence that could be used in the evaluation of the adequacy and effectiveness of the defined elements of the OHSMS.
3. Documents: Used to identify the documents that have been chosen for review to evaluate the OHSMS processes.
4. Records: Used to identify specific records that could be reviewed to evaluate conformance to the organization's established processes and effectiveness of the OHSMS.
5. Interviews: Lists individuals to be interviewed to determine process knowledge, actions performed, and their knowledge and support for the organization's OHSMS.
6. Observations: Used to specify where a physical observation could be used to gather evidence.

For additional information about managing an audit program, conducting a management system audit and evaluating the competence of management system auditors, refer to ANSI/ISO 19011 – Guidelines for Management System Auditing.

OHSMS Section	Potential Sources of Objective Evidence			
	Documents	**Records**	**Interviewee**	**Observations**
Management Leadership	• OHSMS Manual • List of OHSMS documentation	• E-mails or memos from Top Management regarding OHSMS	• Top Management, selected personnel designated with tasks to implement/ maintain OHSMS • Hourly employees	• Management tour of facility
OHS Policy	• OHS Policy	• Records associated with communication of the OHS Policy.	• Selected managers/ supervisors • Hourly Employees	• Policy postings
Responsibility and Authority	• Operating Procedures • Roles and Responsibilities set out in OHSMS Manual	• Organization chart, budgets, and job descriptions • Job descriptions for OHS leader and OHS team members • OHS Team meeting minutes	• Selected managers/ supervisors • OHS Team • Hourly employees	• Team meetings
Employee Participation	• OHSMS procedures • Human Resource policies	• OHSMS Team roster and meeting minutes • Employee suggestions	• Selected managers/ supervisors • Hourly employees	• Team meetings, department meetings, job briefings, safety committee meetings
Review Process	• Procedures specifying processes for OHSMS review	• Records of OHSMS reviews • Results of Risk assessments • Total and significant list of OHSMS issues • Job hazard analyses • Notes of reviews of applicable regulations and standards • Exposure data • Organization chart, budgets, and job descriptions • Audit reports • Incident investigation reports • Monitoring data • Safety inspection reports	• Selected managers/ supervisors • Hourly employees	• Tour facility, compare to OHSMS issues list
Assessment and Prioritization	• Procedures specifying processes for assessing and prioritizing OHSMS issues	• List of identified and prioritized OHSMS issues	• Selected managers/ supervisors/ engineers • Hourly employees	• Tour facility, compare to OHSMS issues list
Objectives and Objective Implementation Plans	• Procedures for establishing and achieving OHSMS Objectives	• Objectives and implementation plans • OHS Team minutes	• Selected managers/ supervisors/ engineers/EH&S Team members • Hourly employees	• Verification of OHSMS objective implementation (as applicable)

	Documents	Records	Interviewee	Observations
Risk Assessment	• Procedures for assessing OHS risks	• Risk assessment results • Job hazard analysis • Exposure assessment records	• Selected engineers, risk assessment and facilities personnel • OHS Team • Hourly employees	• Tour facility and identify potential hazards and confirm assessment of risk
Hierarchy of Controls	• Procedures for selecting OHS controls	• Job hazard analyses and follow up • OHS Team meeting minutes • Facilities work orders • Engineering project logs • Employee suggestions	• Selected engineers and facilities personnel, OHS Team members • Hourly employees	• Tour facility, identify engineering controls, warnings, administrative controls, and PPE, compared to hazards identified and documents reviewed
Design Review	• Procedures for design review and machinery, process and equipment reviews	• Design review meeting minutes • New and revised engineering design releases • Equipment approvals/releases • Facilities Work Orders	• Selected engineers and facilities personnel, including managers and supervisors • Hourly employees	• Design review meeting, new equipment
Management of Change	• Management of change procedures	• Change request and approval records	• Selected mangers and hourly employees • Originators of change requests	• Locations where changes have been implemented • Material of process changes
Procurement	• Procedures for Selection, Evaluation and Management	• Selected supplier self -assessments • Selected supplier audits and ratings • Selected supplier contracts • Incoming product inspection records • Product risk analyses	• Selected supplier management personnel • Hourly employees	• Selected purchased products to check associated procurement records
Contractors	• Procedures for Contractor Safety and Contractor control	• Selected contractor self -assessments • Selected contractor audits and ratings • Selected contractor contracts • Correspondence with customers and other contractors on job sites • Contractor work-related injury/illness data • Relevant contractor incident investigation reports	• Selected supplier management managers/ supervisors, selected on-site contractor managers/ supervisors • Hourly employees	• Identify contractors working at location to check associated contractor control records • Subcontractor jobs

	Documents	Records	Interviewee	Observations
Emergency Preparedness	• Emergency Action Plan • Business continuity plan	• Emergency Drill reports	• Selected managers/ supervisors/ engineers • Hourly employees	• Drills, signage, maps, exits, designated shelters
Education, Training and Awareness and Competence	• Procedure covering Communication and Training	• Electronic training records • Selected hardcopy training records and quizzes (based on interviews with managers/ supervisors) • Training plans to review who requires training vs. who receives training • Records of trainer qualifications	• Selected managers/ supervisors/ engineers • Hourly employees	• Physical observations to verify if practices taught in training programs are followed (as applicable)
Communication	• Procedures for Communication processes including OHSMS information, progress on implementation plans, opportunities for input on hazard control, consultation with contractors and removing barriers to employee participation	• OHS intranet site • E-mails, memos, articles, posters, presentations • Incident, injury and illness reports • Records on contractor communication	• Selected managers/ supervisors/ engineers/EH&S Team members • Hourly employees	• Bulletin board, posters, presentations
Document and Record Control Process	• Document and record Control Procedure • Record retention schedules	• Selected document control history files • Selected records	N/A	• Evaluate whether documents are readily available where needed and protected against damage. Determine whether obsolete documents have been removed.
Monitoring and Measurement	• Procedures for OHS Monitoring, Measurement and assessment processes	• List of parameters to monitor • Selected monitoring data • Records demonstrating communication of monitoring results to relevant parties	• Selected monitoring task owners • Hourly employees	• Monitoring and measurement equipment
Incident Investigation	• Procedures for Incident investigation Procedures	• Recent incident investigation reports (internal and relevant contractor) • Last 3 years' OSHA logs	• Selected managers/ supervisors/ engineers • Hourly employees	• Physical observations of areas associated with incident investigation action items.

	Documents	Records	Interviewee	Observations
Audits	• Procedures for planning and conducting OHSMS Audits	• OHSMS and compliance audit reports	• OHS Team, Internal OHSMS Auditors (as applicable) • Individuals for managing the audit program • Hourly employees	• Observation of workplace, documentation and records to assess accuracy of audits
Corrective and Preventive Actions	• Procedures for Corrective and Preventive Action	• Records associated with the identification and evaluation of nonconformities • Corrective and Preventive Actions (CAPAs) • Records that verify the effectiveness of the corrective and preventive actions taken	• Selected managers/ supervisors/ engineers • Hourly employees	• Physical observations to verify if selective corrective and preventive actions are implemented (as applicable)
Feedback to the Planning Process	• Feedback provisions within the procedures for measuring and monitoring, audits, incident investigations, corrective and preventative action and management review	• Monitoring data and trending records • Incident investigation reports • OHS Objective Implementation Plans • Corrective and Preventive Actions (CAPAs) records • Revised OHSMS Issue lists	• Selected managers/ supervisors/ engineers • Hourly employees	N/A
Management Review (Process, Outcomes and Follow-Up)	• Procedures for OHSMS Management Review	• Management Review schedule/agenda • Management Review minutes and presentation materials • Management Review action item follow-up and reports	• Selected members of top management • Hourly employees	N/A

Appendix M (Informative)

M. Management Review Process (Section 7.1 and 7.2)

A scorecard is a valuable tool to use in an OHSMS management review.

The scorecard quickly focuses top management's attention on the parts of the OHSMS that most need their attention and direction.

Attached is an example OHSMS management review scorecard. This scorecard provides a color-coded assessment of the effectiveness of each OHSMS element. It is based on a 5-category assessment, but an organization may choose to use any number of evaluation categories (such as a "red", "yellow" and "green" traffic-light type of system). It is not recommended to use more than 5 categories.

An organization may choose to use a qualitative or a quantitative evaluation system based on its size, operations, services, or culture. Larger organizations may choose a quantitative system in order to achieve consistency or to compare different business segments. Regardless of whether a quantitative or qualitative system is used, backup data should be available.

An organization should use its scorecard as the basis for the necessary discussion with top management and for top management to provide its direction and action items.

ANSI/ASSE – Z10 Occupational Health and Safety Management Systems Conformance Scorecard

OHSMS CONFORMANCE SCORECARD	10/09	4/10	10/10	12/11	12/12
1. Management Leadership - OHSMS	V	Y	Y		
2. OHSMS Policy	V	Y	Y		
3. Responsibility & Authority	V	Y	G		
4. Employee Participation	V	Y	Y		
5. Initial and Ongoing Reviews	R	Y	G		
6. Assessment and Prioritization (Critical)	R	Y	G		
7. Objectives & Objective Implementation Plans	V	Y	G		
8. Hierarchy of Controls	R	G	G		
9. Design Review and Management of Change	R	R	Y		
10. Procurement	V	V	G		
11. Contractors	V	V	Y		
12. Emergency Preparedness	V	V	Y		
13. Education, Training & Awareness	Y	Y	G		
14. Communication	V	V	G		
15. Document & Record Control Process	Y	Y	G		
16. Monitoring & Measurement	V	Y	G		
17. Incident Investigation	V	V	Y		
18. Audits	V	Y	G		
19. Corrective & Preventive Action	V	Y	G		
20. Feedback to the Planning Process	V	Y	G		
21. Management Review (Process, Outcomes & Follow-Up)	V	G	G		
Overall Rating	**(Violet) Managing Issues**	**(Violet/Yellow) Implementing Process**	**(Yellow/Green) Process Management**	**Approaching World-Class Performance**	**Bullet Proof**

Points Color Code	Performance
4 Blue	World Class OHS Performance
3 Green	Strong. Conforming/complete, may have minor gaps with action plans
2 Yellow	Moderate. Scattered non-conformances need to be addressed, positive trends/major elements in place
1 Violet	Significant non-conformance exist, still needs focus
0 Red	Major effort required, major or systemic non-conformance exist

Appendix N (Informative)

N. Management System Standard Comparison (Introduction)

This table compares ANSI/ASSE with international standards, and other guidelines. The matrix is intended to demonstrate the significant similarity in essential elements of management systems and assist organization in integrating management systems during implementation. Element by element comparison is difficult and check marks simply indicate that the element is present in a standard or document. This is particularly true in the case of ISO 9001–2008 because the purpose of this standard is significantly different than the other management system standards and guidelines listed in this matrix.

ANSI Z10:2012		ISO 14001:2004		OHSAS 18001:2007		ILO OHSMS:2001		VPP (2008)	ISO 9001:2008	
Section	***Criteria***		***Criteria***		***Criteria***		***Criteria***	***Criteria***		***Criteria***
---	Foreword	**---**	Forward	**---**	Forward	---	---	---	**---**	Forward
---	Introduction	---	Introduction	---	Introduction	---	Introduction	---	0.10.2 0.3 0.4	General Process Approach Relation to ISO 9004 Compatibility
1.0	Scope, Purpose, Application	---	---	---	---	---	---	---		
1.1	Scope	1	Scope	1	Scope	2 2.1 2.2 2.3	A national occupational safety and health management system framework National policy National guidelines Tailored guidelines	Categories of Participation.	1.0 1.1	Scope General
1.2	Purpose	---	---	---	---	1	Objectives	---		
1.3	Application	---	---	---	---	---	---	---	1.2	Application
2	*Definitions*	*3*	*Terms and definitions*	*3*	*Terms and definitions*	---	*Glossary*	*Definitions.*	*3*	*Terms and definitions*
3.0	Management Leadership and Employee Participation	---	---	---	---	---	---	Management leadership and employee involvement.		

ANSI Z10:2012		ISO 14001:2004		OHSAS 18001:2007		ILO OHSMS:2001		VPP (2008)	ISO 9001:2008	
3.1	Management Leadership	---	---	---	---	3	The occupational safety and health management system in the organization	Management Commitment.	5.1	Management commitment
3.1.1	Occupational Health and Safety Management System	4.1	General requirements	4.1	General requirements	3	The occupational safety and health management system in the organization	Comprehensive Safety and Health Management System Requirements.	4.1	General requirements
3.1.2	Policy	4.2	Environmental Policy	4.2	OH&S policy	3.1	Occupational safety and health Policy	Management Commitment.	5.3	Quality policy
3.1.3	Responsibility and Authority	4.4.1	Resources, roles, responsibility and authority	4.4.1	Resources, roles, responsibility, accountability and authority	3.3	Responsibility and accountability	Disciplinary System.	5.5.1	Responsibil-ity and authority
3.2	Employee Participation	---	---	4.4.3.2	Participation and consultation	3.2	Worker participation	Employee Involvement.	---	---
4	*Planning*	*4.3*	*Planning (title only)*	*4.3*	*Planning (title only)*	*3.8*	*System planning, development and implementation*	*Management Commitment.*	*5.4.1* 7.2.1	*Quality objectives* Determi-nation of requirements related to the product
4.1	Initial and Ongoing Reviews	---	---	---	---	3.7	Initial Review	Baseline Safety and Industrial Hygiene Hazard Analysis.	---	---

ANSI Z10:2012		ISO 14001:2004		OHSAS 18001:2007		ILO OHSMS:2001			VPP (2008)	ISO 9001:2008	
4.2	Assessment and Prioritization	4.3.1	Environmental aspects	4.3.1	Hazard identification, risk assessment and determination of controls	3.7	Initial Review		Hazard Analysis of Routine Jobs, Tasks, and Processes.	*5.4.1* 7.2.1	*Quality objectives* Determi-nation of requirements related to the product
4.3	Objectives	4.3.3	Objectives, targets and programme(s)	4.3.3	Objectives and programme(s)	3.9	Occupational safety and health objectives		Management Commitment.	5.4.1 7.1	Quality objectives Planning of product realization
4.4	Implementation Plans and Allocation of Resources	---	---	---	---	---	---		Management Commitment.		
5	Implementation and Operation	4.4	Implementa-tion and operation (title only)	4.4	Implementa-tion and operation (title only)	---	Planning and Implementa-tion (title only)		Comprehensive Safety and Health Management System Requirements.	7	Product realization (title only)
5.1	OHSMS Operational Elements	4.4.6	Operational control	4.4.6	Operational control	3.10	Hazard prevention		*Comprehensive Safety and Health Management System Requirements.*	7.5.1	Control of production and service provision
5.1.1	Risk Assessment	4.3.1	Environmental aspects	4.3.1	Hazard identification, risk assessment and determination of controls	3.7 3.16	Initial Review Continual improvement		Worksite analysis.	*5.4.1* 7.2.1	*Quality objectives* Determina-tion of require-ments related to the product
5.1.2	Hierarchy of Controls	---	---	4.3.1	Hazard identification, risk assessment and	3.10.1	Prevention and control measures		Hazard Elimination and Control Methods.	---	---

ANSI Z10:2012		ISO 14001:2004		OHSAS 18001:2007		ILO OHSMS:2001		VPP (2008)	ISO 9001:2008	
					determination of controls					
5.1.3	Design Review and Management of Change	---	---	4.3.1	Hazard identification, risk assessment and determination of controls	3.10.2	Management of change	Hazard Analysis of Significant Changes. Compliance Hazard Control Programs.	7.3	Design and development
5.1.4	Procurement	4.4.6	Operational control	4.4.6	Operational control	3.10.4	Procurement	Pre-use analysis.	7.4	Purchasing
5.1.5	Contractors	4.4.6	Operational control	4.4.3.2 4.4.6	Participation and consultation Operational Control	3.10.5	Contracting	Contract Employee Coverage.	---	---
5.1.6	Emergency Preparedness	4.4.7	Emergency preparedness and response	4.4.7	Emergency preparedness and response	3.10.3	Emergency prevention, preparedness, and response	Emergency Preparedness and Response.	---	---
5.2	Education, Training, Awareness, and Competence	4.4.2	Competence, training and awareness	4.4.2	Competence, training and awareness	3.4	Competence and training	Safety and health training.	6.2.2	Competence, training and awareness
5.3	Communica-tion	4.4.3	Communica-tion	4.4.3.1	Communica-tion	3.6	Communica-tion	Management leadership and employee involvement.	5.5.3	Internal communication
5.4	Document and Record Control Process	4.4.4 4.4.5 4.5.4	Documentation Control of Documents Control of Records	4.4.4 4.4.5 4.5.4	Documenta-tion Control of Documents Control of Records	3.5	Occupational safety and health management system documentation	Documenta-tion and Use of Hazard Analyses.	4.2.3 4.2.4	Control of documents Control of records

ANSI Z10:2012		ISO 14001:2004		OHSAS 18001:2007		ILO OHSMS:2001		VPP (2008)	ISO 9001:2008	
6	*Evaluation and Corrective Action*	*4.5*	*Checking (title only)*	*4.5*	*Checking (title only)*	---	*Evaluation (title only)*	*Worksite analysis.*	*8*	*Measure-ment, analysis, and improvement (title only)*
6.2	Incident Investigation	---	---	4.5.3.1	Incident investigation	3.12	Investigation of worker-related injuries, ill health, disease and incidents and their impact on safety and health performance	Investigation of Accidents and Near-Misses.	---	---
6.3	Audits	4.5.5	Internal audit	4.5.5	Internal audit	3.1.3	Audit	Routine Self-Inspections.	8.2.2	Internal audit
6.4	Corrective and Preventive Actions	4.5.3	Nonconform-ity, corrective action and preventive action	4.5.3.2	Nonconform-ity, corrective action and preventive action	3.15	Preventive and Corrective Action	Hazard prevention and control.	8.3 8.5.2 8.5.3	Control of nonconformi ng product Corrective action Preventive action
6.5	Feedback to the Planning Process	---	---	---	---	---	---	Safety and Health Management System Annual Evaluation.	---	---
7	*Management Review*	*4.6*	*Management review*	*4.6*	*Management review*	*3.14*	*Management Review*	*Safety and Health Management System Annual Evaluation.*	*5.6*	*Management review*
7.1	Management Review Process	---	---	---	---	---	---	Safety and Health Management System Annual Evaluation.		

ANSI Z10:2012		ISO 14001:2004		OHSAS 18001:2007		ILO OHSMS:2001		VPP (2008)	ISO 9001:2008	
7.2	Management Review Outcomes and Follow Up	---	---	---	---	---	---	Safety and Health Management System Annual Evaluation.		
Ap O	Bibliography and References	2	Normative references	2	Normative references	---	Bibliography		2	Normative references
	Not covered in Z10	4.5.2	Evaluation of compliance	4.5.2	Evaluation of compliance			Compliance Hazard Control Programs.		Did not look for gaps
		4.3.2	Legal and other requirements	4.3.2	Legal and other requirements					

Appendix O (Informative)

O. Bibliography and References

Introduction

The items in this bibliography are informative references intended to assist users in implementing this standard. These referenced documents do not establish requirements for the Z10 standard. The listing is not exclusive; references not included may be equally useful. Those references listed have been reviewed and deemed to be the most recent and up-to-date versions and are recommended by individuals who prepared this standard. Many are specific to industry sectors or geographical areas. Some publications are usually available for a fee, and many government organizations offer their publications free of charge.

Internet web sites shown were active at the time this standard was prepared, but are subject to change.

Employee Participation

International Atomic Energy Administration
http://www-pub.iaea.org/books/

1. IAEA-TECHDOC-1329, Safety Culture in nuclear installations, Guidance for use in the enhancement of safety culture, December 2002

Hazards Unlimited

2. **Manuele, F.:** *Advanced Safety Management: Focusing on Z10 and Serious Injury Prevention.* New York: John Wiley & Sons, 2008. This reference addresses specific provisions, including risk assessment methods and prioritization; applying a prescribed hierarchy of controls; implementing safety design reviews; and more. It also explains how to integrate best practices for the prevention of serious injuries in your workplace.

National Institute for Occupational Safety and Health (NIOSH)
http://www.cdc.gov/NIOSH/

3. Publication No. 2001-119: Guide to Evaluating the Effectiveness of Strategies for Preventing Work Injuries. This publication provides students, researchers and practitioners with the tools and concepts required to conduct systematic evaluations of injury prevention initiatives and safety programs.

National Labor Relations Board
https://nlrb.gov

4. 29 USC § 158 – UNFAIR LABOR PRACTICES, NLRA (National Labor Relations Act) Sec. 8. [§ 158.] (a)(2) Unfair labor practices by employer. This section of the act states that that it shall be an unfair labor practice for an employer to dominate or interfere with the formation or administration of any labor organization or contribute financial or other support to it.

Assessment and Prioritization of Issues

Casual Actuary Society
http://www.casact.org

5. Enterprise Risk Management Committee (May 2003). Overview of Enterprise Risk Management. Casualty Actuarial Society.

The Committee of Sponsoring Organizations of the Treadway Commission (COSO)
http://www.coso.org

6. Enterprise Risk Management — Integrated Framework: Executive Summary. (September 2004).

Risk Assessment

American Conference of Governmental Industrial Hygienists (ACGIH®)
http://www.acgih.org/

7. *Threshold Limit Values for Chemical Substances and Physical Agents in the Work Environment and Biological Exposure Indices:* Guidelines to assist in the control of health hazards. Cincinnati, OH: ACGIH®, 2002.

American Industrial Hygiene Association (AIHA®)
http://www.aiha.org

8. **Ignacio, J.S. and W.H. Bullock (eds.):** *A Strategy for Assessing and Managing Occupational Exposures*, 3rd edition. Fairfax, VA: AIHA®, 2006.

   This document provides guidance on characterizing, assessing and managing occupational exposures to chemical, physical and biological agents.

American Institute of Chemical Engineers Center for Chemical Process Safety (AIChE CCPS)
http://www.aiche.org/ccps/

9. **Center for Chemical Safety:** *Guidelines for Chemical Process Safety – Quantitative Risk Analysis*, 2nd edition. New York: John Wiley & Sons, 1999.

   This CCPS Guidelines book provides information to identify incident scenarios and evaluate their risk by defining the probability of failure, the various consequences and the potential impact of those consequences. This technique provides a means to evaluate acute hazards and alternative risk reduction strategies, and identify areas for cost-effective risk reduction.

10. **Arendt, J.S. and D.K. Lorenzo:** *Evaluating Process Safety in the Chemical Industry: A User's Guide to Quantitative Risk Analysis*. New York: John Wiley & Sons, 2000.

    This guide, an update of an earlier American Chemistry Council (ACC) publication utilizing the "hands-on" experience of CPI risk assessment practitioners and safety professionals involved with the CCPS and ACC, explains how managers and users can make better-informed decisions about QRA, and how plant engineers and process designers can better understand, interpret and use the results of a QRA in their plant.

American National Standards Institute (ANSI)
http://www.ansi.org/

11. *ANSI/ASSE Z690.1 Vocabulary for Risk Management*

    (Identical national adoption of ISO Guide 73:2009). This standard provides the definitions of generic terms related to risk management.

12. *ANSI/ASSE Z690.2 Risk Management – Principles and Guidelines*

    (Identical national adoption of ISO 31000:2009). This standard provides principles and generic guidelines on risk management. This standard can be applied throughout the life of an organization and to a wide range of activities, including strategies and decisions, operations, processes, functions, projects, products, services and assets

13. *ANSI/ASSE Z690.3 Risk Assessment Techniques*
    (Identical national adoption of ISO/IEC 31010:2009). This standard is a supporting standard for ANSI/ASSE Z690.1, Vocabulary for Risk Management, (ISO Guide 73:2009), and provides guidance on selection and application of systematic techniques for risk assessment. The application of a range of techniques is introduced, with specific references to other national and international standards where the concept and application of techniques are described in greater detail.

14. *ANSI B11.0 Safety of Machinery; General Requirements and Risk Assessment*
    This standard provides a means to identify hazards associated with particular machines or systems, and provides a procedure to estimate, evaluate, and reduce the risks of harm to individuals associated with these hazards under the various conditions of use of that machine or system.

15. *ANSI-GEIA Std 0010 – Standard Best Practices for System Safety Program Development and Execution*. Department of Defense (DoD), http://www.safetycenter.navy.mil.
    This document outlines a standard practice for conducting system safety. The system safety practice as defined herein provides a consistent means of evaluating identified risks. This document is intended for use as one of the elements of project solicitation for complex systems requiring a systematic evaluation of safety hazards and mitigating measures.

16. *ANSI/RIA R15.06 Industrial Robots and Robot Systems – Safety Requirements*
    Provides requirements for industrial robot manufacture, remanufacture and rebuild; robot system integration/ installation; and methods of safeguarding to enhance the safety of personnel associated with the use of robots and robot systems. The standard also includes a risk assessment methodology to assess risk and select appropriate controls.

17. *MIL-STD-882 Standard Practice for System Safety Program Requirements*
    A key objective of the DoD system safety approach is to include mishap risk management consistent with mission requirements, in technology development by design for DoD systems, subsystems, equipment, facilities, and their interfaces and operation.

International System Safety Society
http://www.system-safety.org/

18. **Stephans, R.A. and W. Talso:** *System Safety Analysis Handbook*, 2nd edition. Unionville, VA: International Systems Safety Society, 1997.
    The System Safety Analysis Handbook is a reference for safety practitioners and others involved in evaluating safety of policies, plans, processes, products, services, or other activities.

19. **Bahr, N.:** *System Safety Engineering and Risk Assessment: A Practical Approach (Chemical Engineering*, 1st edition. Boca Raton, FL: CRC Press, 1997.
    This reference discusses how to implement a cost-effective safety management program. It also demonstrates how to set up data management systems and how to set up an accident investigation board, and carry out risk assessment and risk evaluation.

National Institute for Occupational Safety & Health (NIOSH)
http://www.cdc.gov/niosh/

20. **National Institute for Occupational Safety and Health (NIOSH):** *Pocket Guide to Chemical Hazards and Other Databases*. Cincinnati, OH: NIOSH, 2000.

    The guide is intended as a source of general industrial hygiene information on several hundred chemicals/ classes for workers, employers, and occupational health professionals. The NPG presents key information and data in abbreviated or tabular form for chemicals or substance groupings (e.g. cyanides, fluorides, manganese compounds) that are found in the work environment. The information found should help users recognize and control occupational chemical hazards.

Design Review and Management of Change

American National Standards Institute (ANSI)
http://www.ansi.org/

21. *ANSI B11.TR7 Designing for Safety and Lean Manufacturing*

    A guide on integrating safety and lean manufacturing principles in the use of machinery. An ANSI Technical Report that provides guidance on integrating safety with lean principles and thinking applicable to many industry sectors.

American Society of Safety Engineers (ASSE)
http://www.asse.org

22. *ANSI/ASSE A10.1 Construction and Demolition Operations, Pre-Project & Pre-Task Safety and Health Planning*

    The primary purpose of this standard is to assist construction owners, project constructors and contractors in making pre-project and pre-task safety and health planning a standard part of their planning processes. The standard is also intended to assist owners in establishing a process for evaluating project constructor candidate safety and health performance and planning practices.

23. *ANSI/ASSE Z590.3 Prevention through Design, Guidelines for Addressing Occupational Hazards and Risks in Design and Redesign*

    This standard provides guidance on including prevention through design concepts within an occupational safety and health management system. Through the application of these concepts, decisions pertaining to occupational hazards and risks can be incorporated into the process of design and redesign of work premises, tools, equipment, machinery, substances, and work processes including their construction, manufacture, use, maintenance, and ultimate disposal or reuse.

National Safety Council (NSC)
http://www.nsc.org

24. *Safety through Design*

    Safety through Design discusses the need to incorporate safety into the design, rather than retrofit. This book describes how risk assessment is used to integrate safety into the design process for your organization. An organization's policies should be such that safety, health and environmental concerns can be designed and builtin, rather than added after the job/product has been put into operation.

Human Factors

American National Standards Institute (ANSI)
http://www.ansi.org/

25. *ANSI B11 TR1-Ergonomic Guidelines for the Design, Installation and Use of Machine Tools*
    The goal of this document is to provide guidance on the practical application of ergonomic principles in order to avoid work-related injuries and musculoskeletal disorders (MSDs), increase productivity, and improve product quality.

American Industrial Hygiene Association (AIHA®)
http://www.aiha.org

26. **Rostykus, W.:** *Ergonomics Program Guidance Document Aligned with ANSI/AIHA® Z10–2005*. Fairfax, VA: AIHA®, 2008.
    Managing and integrating an ergonomics program following the Occupational Health and Safety Management System standard (ANSI/AIHA Z10–2005) is outlined in this newest ergonomics guideline. It maps elements of an ergonomics program, and managing ergonomic improvements, within an occupational health and safety management system.

27. **Sanders, M.S. and E.J. McCormick:** *Human Factors in Engineering and Design*. New York: McGraw-Hill, 1993.
    This reference describes human factors and ergonomics written from an engineering viewpoint and covers information on input, human output and control, environmental conditions and workplace design.

28. **Woodson, W.E., B. Tillman, and P. Tillman:** *Human Factors Design Handbook*, 2nd edition. New York: McGrawHill, 1992.
    A design reference with detailed illustrations of vehicle and transportation design, controls and displays, equipment design and more.

American Petroleum Institute (API)
http://www.api.org

29. *API PUBL 770 Manager's Guide to Reducing Human Errors, Improving Human Performance in the Process Industries*, Washington, D.C.: API, 2001.
    This Guide is intended for an audience of middle managers to senior executives who have different levels of knowledge about human factors engineering. It is designed to equip them with a basic understanding of the causes of human errors and to suggest ways for reducing human errors at individual facilities. It also describes how to incorporate human reliability analysis (HRA) into process safety management activities.

Federal Aviation Administration
http://www.hf.faa.gov

30. *MIL-STD-1472F Department of Defense Design Criteria Standard – Human Engineering*. Washington, D.C.: U.S. Department of Defense, 1999.
    This document presents human engineering principles, design criteria, and practices to integrate humans (their requirements) into systems and facilities to achieve effectiveness, simplicity, efficiency, reliability, and safety of the system operation, training, and maintenance.

Contractors

American Industrial Hygiene Association (AIHA®)
http://www.aiha.org

31. **American Industrial Hygiene Association (AIHA®):** *Health and Safety Requirements in Construction Contract Documents*. Fairfax, VA: AIHA® 2005.

    Best practices and current procedures used to manage contractor health and safety activities through construction and post-construction work are provided in this guideline.

American National Standards Institute (ANSI)
http://www.ansi.org/

32. *ANSI/ASSE A10.33 Safety and Health Program Requirements for Multi-Employer Projects*

    This standard sets forth the minimum elements and activities of a program that defines the duties and responsibilities of construction projects where a single Project Constructor supervises and controls the project.

33. *ANSI/ASSE A10.38 Basic Elements of a Program to Provide a Safe and Healthful Work Environment*

    This standard establishes the minimum elements of a program for protecting the safety and health of employees involved in construction activities.

American Petroleum Institute (API)
http://www.api.org

34. API RP 2221 *Contractor and Owner Safety Program Implementation* – 3rd edition

    Provides information to assist the refining and chemical industry facility owners and contractors in implementing an effective contractor safety and health program. It includes information on understanding the design process and on implementing a safety and health program.

35. API RP 76 *Contractor Safety Management for Oil and Gas Drilling and Production Operations* – 2nd edition, 2007

    This publication is intended to assist Operators, Contractors, and Subcontractors (Third Parties) in the implementation of a Contractor safety program and improve the overall safety performance while preserving the independent contractor relationship.

International Association of Oil and Gas Producers (OGP)
http://info.ogp.org.uk/Geophysical/

36. *OGP Reference 6.64/291 – HSE Management – Guidelines for Working Together in a Contract Environment*

    The overall objective of this guideline is to improve company and contractor health, safety, and environmental performance regarding exploration and production activities.

Emergency Preparedness

Department of Transportation (DOT)
http://www.dot.gov

37. **U.S. Department of Transportation:** *Emergency Response Guidebook*

    The Emergency Response Guidebook (ERG2000) was developed as a guide to aid first responders in quickly identifying the specific or generic classification of the material(s) involved in the incident, and protecting themselves and the general public during this initial response phase of the incident.

Federal Emergency Management Agency (FEMA)
http://www.fema.gov/library

38. *Emergency Management Guide for Business and Industry (FEMA 141)*, October 1993.
    This guide provides step-by-step advice on how to create and maintain a comprehensive emergency management program. It can be used by manufacturers, corporate offices, retailers, utilities, or any organization where a sizeable number of people work or gather.

National Fire Protection Association
www.nfpa.org

39. *NFPA 1600 Standard on Disaster/Emergency Management and Business Continuity Programs*
    This standard provides guidance for preparedness for, response to and recovery from disasters resulting from natural, human or technological events.

Occupational Safety and Health Administration
http://www.osha.gov

40. 29 CFR 1910.38(a) Employee Emergency Plans and Fire Prevention Plans
    An employer must have an emergency action plan whenever an OSHA standard in this part requires one. The requirements in this section apply to each such emergency action plan.

41. OSHA Publication 3088 How to Plan for Workplace Emergencies and Evacuations
    This booklet is designed to help the employer plan for the possibility of emergency or disaster.

Training, Awareness and Competence

American National Standards Institute (ANSI)
http://www.ansi.org
http://www.asse.org

42. *ANSI/ASSE Z490.1 Criteria for Accepted Practices in Safety, Health, and Environmental Training*
    Establishes voluntary criteria for safety, health, and environmental training programs, including development, delivery, evaluation and program management.

43. *ANSI/ASSE Z590.2, Criteria for Establishing the Scope and Functions of the Professional Safety Position*
    This standard establishes the scope and functions of the professional safety position. The intent of the standard is to consolidate in a clear and consistent manner an objective assessment of the professional responsibility of the professional safety position.

International Association of Oil and Gas Producers (OGP)
http://info.ogp.org.uk/Geophysical/

44. *OGP Reference 6.78/292 HSE Competence Assessment Training Guidelines for the Geophysical Industry* This document provides guidance to training providers on the contents and emphasis of training required by the geophysical industry.

Occupational Health and Safety Administration (OSHA)
http://www.osha.gov/

45. *OSHA Publication 2254 Training Requirements in OSHA Standards and Training Guidelines*
    OSHA's training-related requirements have been excerpted and collected in this booklet to help employers, safety and health professionals, training directors, and others with a need to know.

Audits

American National Standards Institute (ANSI)
http://www.ansi.org/

46. *ANSI/ASSE A10.39 Construction Safety and Health Audit Program*
    This standard identifies the minimum performance elements that, when properly utilized, will allow for a competent evaluation of a construction safety and health program. Further, it will identify those areas where systems, records, and performance elements are required in order to produce a quality audit.

47. *ANSI/ISO 19011 Guidelines for Management System Auditing*
    This provides guidance on principles of auditing, management system audit programs, conducting management system audits, guidance on the competence of management system auditors.

International Association of Oil and Gas Producers (OGP)
http://info.ogp.org.uk/Geophysical/

48. *OGP Reference 6.53/245 – Guidelines for HSE Auditing in the Geophysical Industry*
    This document provides guidance on auditing health, safety, and environmental programs in the oil and gas sector. Audits help to protect the interests and well-being of employees, customers, visitors, and local communities.

Other Useful References:

Management System Implementation

American Chemistry Council (ACC)
http://www.americanchemistry.com

49. Responsible Care® Management System RCMS, 2004
    A voluntary program to achieve improvements in environmental, health and safety performance beyond levels required by the US government.

50. Responsible Care RC14001
    A certification process that allows participating organizations to gain accredited certificates for both ISO 14001 Environmental Management Systems and Responsible Care 14001 Management Systems in a single audit.

American Industrial Hygiene Association (AIHA®)
http://www.aiha.org

51. **Levine, S. and C. Redinger:** *Occupational Health and Safety Management System Performance Measurement, A Universal Assessment Instrument*. Fairfax, VA: AIHA®, 1999.
    Provides a means for measuring the effectiveness of Occupational and Environmental Health and Safety management systems.

American Petroleum Institute (API)
http://www.api.org

52. *Publication 9100A, Model Environmental, Health and Safety (OHS) Management System*
    A voluntary tool to assist companies in developing an Environmental, Health, and Safety management system.

53. *API Publication 9100B, Guidance Document for Model OHS Management System*
Provides generic assistance for implementation of API RP 9100A Model Environmental, Health, and Safety Management System".

OHSAS Project Group 2008

54. *OHSAS 18001 Occupational Health and Safety Management Systems Requirements*
This standard specifies requirements for an occupational health and safety (OH&S) management system.

55. *OHSAS 18002 Occupational Health and Safety Management Systems. Guidelines for the implementation of OHSAS 18001*
Provides generic assistance for implementation of BS OHSAS 18001.

Business South Australia (SA)
http://www.epa.sa.gov.au/

56. *Small Business Environmental Management Solutions: A Guide to Manage the Environmental Impacts of a Business Using a Five-stop Environmental Management System*

Cal/OSHA
http://www.dir.ca.gov

57. *Injury and Illness Prevention Program* (Section 3203)
This publication sets out requirements for employers to implement an effective Injury and Illness Prevention Program.

International Association of Oil and Gas Producers (OGP) http://www.ogp.org.uk

58. *Guidelines for the Development and Application of Health, Safety and Environmental Management Systems* (Reference 210), 1994.
These guidelines describe a management system for setting and implementing company policy and objectives on health, safety and the environment (HSE).

International Labor Organization (ILO)
http://www.ilo.org/public/english/

59. *ILO-OSH Guidelines on Occupational Safety and Health Management Systems*
Voluntary guidelines on occupational safety and health management systems according to internationally agreed principles by ILO's tripartite constituents.

American Society of Quality (ASQ)/ International Organization of Standardization (ISO)
http://www.iso.org/

60. *ANSI/ISO/ASQ E14001, Environmental Management Systems – Requirements with Guidance for Use* (a.k.a. ANSI/ISO/ASQ 14001-1996 (NSF) Title: Environmental Management Systems Specification with Guidance for Use): This standard specifies requirements for an environmental management system to enable an organization to develop and implement a policy and objectives which take into account legal requirements and other requirements to which the organization subscribes, and information about significant environmental aspects.

61. *ANSI/ISO/ASQ 26000 Guidance on Social Responsibility*
    This International standard provides guidance on the underlying principles of social responsibility, recognizing social responsibility and engaging stakeholders, the core subjects and issues pertaining to social responsibility and on ways to integrate socially responsible behavior into the organization.

62. ANSI/ISO/ASQ Q9001-Quality management systems – Requirements: An international standard that specifies requirements for a quality management system where an organization a) needs to demonstrate its ability to consistently provide a product that meets customer and applicable regulatory requirements, and b) aims to enhance customer satisfaction through the effective application of the system, including processes for continual improvement of the system and the assurance of conformity to customer and applicable regulatory requirements.

Occupational Health and Safety Administration (OSHA)
http://www.osha.gov/

63. *54:3904-3916 Safety and Health Program Management Guidelines, Issuance of Voluntary Guidelines*
    The guidelines consist of safety and health management practices used by employers for protecting the safety and health of their employees.

64. Voluntary Protection Program (VPP) – *So You Want to Apply to VPP*
    OSHA encourages private and public sector efforts to improve occupational safety and health trough the Voluntary Protection Programs (VPP). OSHA recognizes workplaces with excellent safety and health management systems and promotes them as model workplaces.

Process Safety Management

American Institute of Chemical Engineers Center for Chemical Process Safety (AIChE CCPS)
http://www.aiche.org/ccps/

65. **Center for Chemical Process Safety (CCPS):** *Guidelines for Hazard Evaluation Procedures*, 2nd edition. New York: John Wiley & Sons, 2008.
    This publication provides guidance in methodologies that process safety demands.

American Petroleum Institute (API)
http://www.api.org/

66. *RP 752 Management of Hazards Associated with Location of Process Plant Buildings: Guidance for Identifying Hazards and Managing Related Risks*
    This reference focuses on management of hazards in refineries, petrochemical and chemical operations, natural gas liquids, extraction plants and other facilities covered by the OSHA Process Management Standard, 29 CFR 1910.119.

67. *Pub. 760 Model Risk Management Plan Guidance for Petroleum Refineries – Guidance for Complying with EPA's RMP Rule (40 Code of Federal Regulations 68)*
    Provides detailed guidance and specific examples for refineries to reduce cost and time necessary to comply with EPA's RMP rule.

68. Pub. 761 Model Risk Management Plan Guidance for Exploration and Production Facilities Guidance for Complying with EPA's RMP Rule (40 Code of Federal Regulations 68)
    Provides detailed guidance and specific examples for gas plants to reduce the time and cost necessary to comply with EPA's RMP Rule.

Environmental Protection Agency (EPA)
http://www.epa.gov/

69. 40 CFR 68 EPA Risk Management Program (RMP) Rule

    The Clean Air Act requires EPA to promulgate regulations to prevent accidental releases of regulated substances and reduce the severity of those releases that do occur. EPA is promulgating rules that apply to all stationary sources with processes that contain more than a threshold quantity of a regulated substance. Processes will be divided into three categories based on: the potential for offsite consequences associated with a worst-case accidental release, accident history, and compliance with the prevention requirements under OSHA's Process Safety Management Standard.

Occupational Health and Safety Administration (OSHA)
http://www.osha.gov/

70. 29 CFR 1910.119 Process Safety Management of Highly Hazardous Chemicals

    This regulation contains requirements for preventing or minimizing the consequences of catastrophic releases of toxic, reactive, flammable, or explosive chemicals. These releases may result in toxic, fire, or explosion hazards.

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- Z244 Control of Hazardous Energy – Lockout/Tagout & Alternative Methods
- Z359 Fall Protection
- Z390 Hydrogen Sulfide (H2S) Training Program
- Z490 Safety, Health & Environmental Training
- Z590 Competence & Certification in the Safety Profession and Prevention Through Design

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