

Integrating Waste Management with Job Hazard Analysis

Introduction

The web-based Automated Job Hazard Analysis (AJHA) system is a tool designed to help capture and communicate the results of the hazard review and mitigation process for specific work activities. In Fluor Hanford's day-to-day work planning and execution process, AJHA has become the focal point for integrating Integrated Safety Management (ISM) through industrial health and safety principles; environmental safety measures; and involvement by workers, subject-matter experts and management. This paper illustrates how AJHA has become a key element in involving waste-management and environmental-control professionals in planning and executing work.

Executive Summary

To support implementing requirements for waste management and environmental compliance within the core function and guiding principles of an integrated safety management system (ISMS), Fluor Hanford has developed the a computer-based application called the "Automated Job Hazard Analysis" (AJHA), into the work management process. This web-based software tool helps integrate the knowledge of site workers, subject-matter experts, and safety principles and requirements established in standards, and regulations. AJHA facilitates a process of work site review, hazard identification, analysis, and the determination of specific work controls. The AJHA application provides a well-organized job hazard analysis report including training and staffing requirements, prerequisite actions, notifications, and specific work controls listed for each subtask determined for the job.

AJHA lists common hazards addressed in the U.S. Occupational, Safety, and Health Administration (OSHA) federal codes; and State regulations such as the Washington Industrial Safety and Health Administration (WISHA). AJHA also lists extraordinary hazards that are unique to a particular industry sector, such as radiological hazards and waste management. The work-planning team evaluates the scope of work and reviews the work site to identify potential hazards. Hazards relevant to the work activity being analyzed are selected from the listing provided in AJHA. The work team can also enter one-time hazards unique to the work activity. Because AJHA is web based, it can be taken into the field during site walk-downs using wireless or cell- phone technologies. Once hazards are selected, AJHA automatically lists mandatory and optional controls, based on the referenced codes and good work practices. The hazards selected may also require that additional specific analysis be performed, focusing on the unique characteristics of the job being analyzed. For example, the physical characteristics, packaging, handling, and disposal requirements for a specific waste type. The work team then evaluates the identified hazards and related controls and adds details as needed for the specific work activity being analyzed.

The selection of relevant hazards also triggers required reviews by subject-matter experts (SMEs) and the on-line completion of necessary forms and permits. The details of the hazard analysis are reviewed on line or in a work- team group setting. SME approvals are entered on-line and are published in the job hazard analysis report.

History

Before the AJHA system was developed and implemented, the number of “OSHA-recordable” and “lost-work-day” injuries at Hanford was unacceptable. Job planners and various technical authorities within Environmental, Safety, and Health (ES&H) organizations would independently conduct their job hazard analyses (JHAs), causing overlap and duplication of effort without coordination among these technical disciplines. Further, the workers were normally not involved in the JHA process. The hazard analysis reports were published separately and placed into the work packages, but the results were not integrated.

By integrating the analysis by safety professionals, management, and workers within a single automated system, AJHA facilitates a systematic and coordinated approach to analyzing and preparing for hazards. This tool has streamlined the hazard analysis process by eliminating duplication and potentially conflicting control measures prescribed by the various safety and operational disciplines. Since AJHA was implemented in 1998, Fluor Hanford has achieved some impressive results:

- An injury rate that is 75 percent better than the national average for the industry
- A 73 percent reduction in the OSHA-recordable rate in the first three years
- An 84 percent reduction in the lost-work-day rate.

During the early implementation of this tool, a fringe benefit was also discovered. The number of false starts and work delays went down because work teams were more likely to arrive on the scene already prepared with all necessary permits, safety, and personal protective equipment.

Process Description

AJHA facilitates managing hazards as a major element of the work-planning process. It is, therefore, the most visible and tangible means by which management, workers, and ES&H professionals come together to execute the core functions of ISMS. The following process description demonstrates how the job hazards analysis (JHA) process steps facilitated in AJHA correlate directly to the core functions of ISMS.

Core Function – Define the Scope of Work

The first step of the JHA process is to define the scope of work. Information characterizing the job is entered into AJHA at the “Task Information” screen. The nature of the tasks, the work location, and environmental conditions are all determining factors in the depth of the hazard analysis. **It is essential that the work-planning team understand the entire work scope, including the setting where the work will be performed.** Statistically, a high percentage of injuries occur due the physical environment of the workplace, regardless of the nature of the work. Accidents occur when a combination of human-performance precursors and hazardous conditions exist and mitigating controls are NOT deliberately implemented. Many JHA approaches are designed to identify the hazards and controls only for the most visible steps of the job, but such an approach reduces the emphasis on the principles of ISMS, is dangerous, and will ultimately result in more injuries.

Core Function – Identify Hazards and Requirements

Fluor evaluates each job during a “walk-down” of the jobsite to identify possible hazards. “Hazard statements” are arranged in the AJHA in a “tree” structure, with various levels of detail. Each hazard

topic is supported with help information and links to driver requirements like OSHA standards, company policies and procedures, as well as other useful information such as programmatic safety documents, environmental and safety web sites, and lessons learned reports. The hazards that are determined to pose a potential impact are identified, based on the description of the work and the physical conditions observed at the work-site during the walk-down. The hazards that are identified are selected in AJHA by clicking on “YES “adjacent to the hazard question.

Core Function – Analyze Hazards and Implement Controls

The way Fluor Hanford approaches the analysis of potential hazards is key to the ISMS success that has resulted in the dramatic reduction of recordable and lost work day injury cases. The hazards that are selected will automatically trigger a set of mandatory and optional controls tailored uniquely for the characteristics of each hazard condition. The mandatory controls are based on federal codes, state and local regulations, company policies and industry best practices. Among these, for the management of waste, are training requirements including Hazardous Waste Operations (HAZWOPER) and Asbestos Worker training.

Optional controls may be required, depending on the specific characteristics of the job being analyzed. The work team determines which controls must be implemented and during which subtasks of the job. The work team can add detail to each hazard and each control as needed.

Depending on the hazards selected, SMEs may be triggered for involvement, including their review and approval of the complete hazard analysis. This involvement may also require additional analyses. This facet of the AJHA design demonstrates that it is far more than a simple electronic checklist. Exact conditions in the field cannot be predetermined. For example, when work is planned for a hazardous waste activity, the AJHA would trigger several specific analysis actions to determine specific elements of the task: the type of waste, the way it would be handled, the disposal controls required, and appropriate emergency-response actions. The full set of AJHA hazard and control relationships includes more than 300 specific analyses that may be triggered when the hazard conditions warrant such expert involvement.

It is this process of focused hazard identification, analysis, tailored controls, and the involvement, when warranted, of SMEs that constitutes an effective graded approach. This assures all hazard controls will be applied in the safest and most cost-effective way. This is why AJHA is a part of a system considered to be a “best practice.” To achieve a “graded approach,” other JHA systems attempt to use a calculation to limit the hazard analysis to a percentage of the work steps. History and the principles of human performance indicators demonstrate that most accidents do NOT involve the most obvious hazards. Limiting hazard analyses only to a percentage of the work steps, based on the most obvious hazards, will result in more injuries.

Managing hazards for a work activity certainly includes addressing control measures implemented by the worker during the performance of the job. Work controls in AJHA are listed as “controls,” such as physical protective measures, barriers, lock and tag, and personal protective equipment (PPE). These controls are listed in the AJHA report for each identified hazard, as they apply to each task defined for the job. This approach enables the work team to identify which hazards will be present and which related controls must be implemented during each task.

A fully integrated safety management system, however, must also address controls implemented at all levels of work management. When the hazards are identified in AJHA, not only are work controls listed, but also control measures related to training, staff qualifications, prerequisites, and notifications. Because these kinds of control measures are most often coordinated by supervision, the AJHA lists these controls in specific sections of the final report especially dedicated to those control categories. This listing helps management assure that workers are fully trained and qualified for the tasks they will perform, that prerequisite control measures are adequate and in place at the appropriate point in time, and notifications are made in a timely fashion.

Required forms and permits are triggered when certain hazards are present. Occasionally, a form or permit is required to be completed and posted at the worksite before the work activity is started, or attached to the work item. Forms associated with waste packaging, labeling and handling instructions are provided through AJHA. The forms or permits for the work being planned are filled out on-line and printed with the AJHA report. The forms that are completed for a specific work activity are saved with that AJHA record for future reference.

Waste handling and work that otherwise has a potential environmental impact often require the submission of some permits far in advance of the performance date of the work. These permits are typically managed at a higher programmatic level than during the planning for day-to-day work. However, the AJHA does trigger the involvement of the Environmental Compliance Officer (ECO) to check the work scope against required permitting and waste-handling specifications. When the required permits are in place, the ECO makes sure any specific work activity proceeds according to these documents. If required permits are not already in place, the ECO expedites the submittal and approval of the documents.

The AJHA also provides an automated check to assure all elements of the hazard analysis are complete and consistent. This check highlights any unanswered hazard questions, any specific analysis requirements not addressed, and any incomplete forms or permits.

Core Function – Perform Work Within Controls

Once the hazard analysis is complete, the AJHA report is ready to print. The report feature automatically assembles the results of the hazard analysis into a logical arrangement on the AJHA report. The job information and JHA participants are listed in the front of the report. Training requirements, staffing considerations, prerequisite actions, and any required notifications are listed, respectively, in dedicated sections of the report. The organization of information makes it easy for supervisors to address the actions in a timely fashion. The work controls that must be implemented during the performance of the work are listed as they apply to each task of the job. The hazard and control details that were entered during the analysis process are published within each section of the report. This arrangement of controls and control details by task makes it easier for work planners to associate the work controls with the relevant sections of the detailed work instructions as needed.

To assure the work is performed safely according to the specified controls, a pre-job briefing is held to discuss the job tasks and each of the hazards and related controls as identified in the completed hazard analysis. The completion of prerequisites is assured, required forms and permits are reviewed with the workers, and work controls that have been integrated in the work instructions are discussed in detail.

Core Function – Feedback

Another key element of an effective safety-management program is continuous feedback and improvement. The AJHA tool has applied this principle to work planning and hazard analysis. It features a module that associates informal worker feedback and formal post-job and ALARA reviews with work plans, including previously performed hazard analyses. The AJHA feedback module makes it easy, when planning for a new work task, to retrieve feedback records by topical areas and word recognition. The lessons learned from prior instances of work activities, provides an invaluable source of information about unique characteristics and conditions related to the work being planned.

CONCLUSION

The AJHA represents an innovative approach to integrating safety management and environmental controls into the hazards analysis process. This automated tool goes far beyond a mere computer program. It provides a systematic and integrated process that brings together the knowledge of the people that are closest to the work with the wisdom that has evolved into industry standards and best practices. No other system provides such a complete union of knowledge, standards, and integration with work control. This system employs newly emerging, yet cost-effective technology that puts the resources of a powerful database in the palm of a planner's hand to take into the field where the real hazard identification and analysis begins. It promotes a consistent, repeatable, and well-documented hazard-analysis program applied at the task/activity level. This system also capitalizes on using feedback and lessons learned, not just as a record, but also as an element of planning and avoiding hazards in the future.

The demonstrated success of integrating the safety management program through the AJHA process is undeniable, with injury rates and lost-work-day cases reduced nearly to zero. Integrating the safety aspects of waste management into the hazard analysis program has also proven to be successful as well, with fewer non-compliances for environmental work. . The teamwork that has evolved has improved the overall work-planning process, drastically reducing the number of false starts and work delays.