

2007 PacifiCorp Design and Development Competition

Developed for Wallerich Company, Inc.

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EXECUTIVE SUMMARY

As part of its goal to become the world's safest logging and production facility, the Wallerich Company has requested proposals for training solutions that will help it move toward improving safety performance. The Total Performance Group looks forward to working with Wallerich in meeting this goal through the following:

- initial analysis that drives training and performance solutions tailored to Wallerich's specific needs, employees, and facilities;
- engaging and effective training methods that support transfer to the workplace;
- course content tailored to the needs of Wallerich employees;
- systems and tools to support performance during and after training;
- measurement systems that tie performance directly to organizational goals and objectives; and
- evaluation of training impact on learning, performance, and organizational outcomes.

This proposal describes the components of our solution and how they will be applied to meet Wallerich's training and performance improvement goals. We propose an engagement of three years, with full implementation and measurable results after the first year. We look forward to the opportunity to work with Wallerich in developing training that will improve employee safety.

PROBLEM AND BUSINESS CASE

Although the Wallerich Company is currently meeting the industry average for safety performance, it has chosen to become the world's safest logging and production facility, a

laudable and ambitious goal. Accidents in the workplace result in costs far above those directly tied to the accident, such as medical expenses and lost time. Monetary costs include

- increased premiums for workers' compensation;
- employee downtime not only of injured workers but also their peers and supervisors;
- increases in company health insurance premiums; and
- training costs of either permanent or temporary employees to replace injured employees.

However, the impact of accidents goes far beyond monetary costs. Legal issues as well as moral and ethical issues are involved in any workplace accident. The Wallerich Company has served an important role in the community and in the families of its employees for generations—a role that enhances its moral and ethical imperative toward safety.

To achieve its safety goals, the Wallerich Company has identified six areas in need of training:

- accident prevention and investigation;
- ergonomics with back injury prevention/safe lifting;
- fall protection;
- eye protection/safety;
- emergency and disaster preparedness; and
- hearing conservation, respiratory protection and CPR, First Aid, and AED training.

We propose training in each of these areas using a combination of classroom, simulation, and on-the-job approaches. Tools designed to support and improve performance will also be developed to increase transfer to the job and maintain high levels of safe performance. Our approach is designed to ensure that safety training will be an investment for Wallerich rather than a lost cost with no significant return on the investment.

SOLUTION

Our proposal includes four components:

- A. **Analysis of needs, learners, context, and content:** Up-front analysis will identify knowledge, skills, and attitudes in need of training; employee characteristics important for training design; and components of the work environment that are likely to support or fail to support performance on the job.
- B. **Design and development of instruction and performance supports:** Training will focus on specific skills related to the six training topics identified by Wallerich. We will also develop tools to support continued safe performance on the job, including components such as goal-setting, measurement, and incentive systems. If additional needs for safety training or performance improvement are identified during analysis, we will recommend solutions that Wallerich may consider in subsequent phases of its safety initiative.
- C. **Evaluation of training and performance supports:** Evaluation will include measuring the impact of training and performance support at four levels (Kirkpatrick, 1998): (1) learner reaction, (2) learning, (3) performance, and (4) company impact.
- D. **Implementation, maintenance, and renewal:** A successful training and performance solution involves continual analysis and evaluation. We will work with Wallerich in developing systems to ensure that training and performance supports are evaluated and revised as necessary.

Our initial timeline (see Table 1) involves a period of three years. Year one includes up-front analysis, design, and development, with a graduated implementation of high-impact courses at six, nine, and twelve months. Years two and three include implementation, evaluation, and

revision of the program. This extended period of evaluation and revision will allow us to ensure successful implementation and a significant impact on organizational results. Each of these four components and our initial proposal for implementing them are described in the following sections.

Table 1. Initial timeline for analysis, design, development, and evaluation.

Year 1	Analysis, design development, and validation of training and performance support systems	<ul style="list-style-type: none"> ▪ Analyze needs, learners, context, and content to inform design ▪ Design, develop, and pilot test classroom training; simulations; and on-the-job training for each of the following topics: <ul style="list-style-type: none"> ▪ Accident prevention and investigation ▪ Ergonomics with back injury prevention/safe lifting ▪ Fall protection ▪ Eye protection/safety ▪ Emergency and disaster preparedness ▪ Hearing conservation, respiratory protection and CPR, First Aid, and AED training ▪ Design, develop, and implement selected performance supports ▪ Report pilot study and revise the training; modify performance supports as needed
Year 2	Implementation of training Evaluation of effectiveness for training and performance supports	<ul style="list-style-type: none"> ▪ Implement classroom training, simulations, and on-the-job training and performance supports across all work sites ▪ Evaluate the effectiveness of training and performance supports ▪ Synthesize findings ▪ Revise the training and modify performance supports, if necessary
Year 3	Continued implementation, re-evaluation, and refinement of training and performance supports	<ul style="list-style-type: none"> ▪ Continue implementation ▪ Re-evaluate the validity and effectiveness of the training and performance supports ▪ Refine training and performance supports if necessary

A. Analysis of Needs, Learners, Context, and Content

Our initial phase will include analysis of needs, learners, performance contexts, and components of the tasks designated for training and possible performance support.

Needs analysis

During needs analysis, we will

- analyze incident reports from the last three years to identify the behaviors that resulted in the most incidents;
- distribute surveys to supervisors, managers, and employees in each work site to identify the knowledge, skills, and attitudes they perceive as most in need of training or other supports; and
- conduct focus group interviews with supervisors, managers, and key employees in each work site to further identify needs and expand on issues identified in survey responses.

Conducting initial needs analysis will allow us to

- **Identify priorities:** Analyzing incident reports will allow us to identify the most costly incidents in terms of both monetary and human costs. These incidents will be targeted for immediate intervention, to provide the largest return on investment in the shortest time period (Kaufman, Oakley-Browne, Watkins & Leigh, 2003).
- **Identify root causes:** Often, only a few unsafe behaviors or conditions result in a majority of reported incidents (McSween, 2003). These unsafe behaviors typically result from a lack of either skills or support for desired performance (Gilbert, 1978). Identifying the root causes will allow us to identify and develop appropriate intervention whether it is training, performance support, or both.

- **Create buy-in for the training initiative:** Wallerich employees are most familiar with everyday operations and are likely to have ideas about what is needed in their specific roles and work environments. We will include all stakeholders in the change process to help ensure support for the solution.
- **Support transfer of training:** Thorough, up-front needs analysis is critical to ensure transfer (Baldwin & Ford, 1988; Ford & Weissbein, 1997). Training that does not transfer to on-the-job performance is a cost for the company, rather than an investment. Initial needs analysis will help ensure that training is an investment.

Learner Analysis

A more detailed analysis of the target audience will supplement information already provided about Wallerich employees. Surveys, interviews, and onsite visits for informal observation will allow us to identify audience characteristics that may affect the acceptance and success of training, such as experience with and preference for training methods. Training methods will be modified to fit the needs and preferences of Wallerich employees so that training is both effective and appropriate.

We will also use learner analysis to identify what knowledge, skills, and attitudes employees already possess. These will form the starting point for training in each of the identified areas.

Context Analysis

Wallerich has requested that all employees receive training in specified skills. However, differences among the logging facility, the paper production plant, and packaging materials plants may require training methods and content specific for each facility. Context analysis will be used to determine.

- **Site-specific needs:** Information on environmental aspects that directly affect the performance of skills, such as varied hazards, equipment, and resources, will be used to develop training content that is specific to each work site.
- **Aspects of performance context impacting performance:** Environmental aspects not directly related to the training content such as noise, social context, time constraints, and available resources, can often impact ultimate performance (Bransford, Brown, & Cocking, 2000). We will analyze the context of each work site to determine which aspects should be replicated during training, ensure that employees have the necessary resources to perform safely after training, and develop additional supports needed to enable employee skill transfer.

Content and Instructional Analysis

The content for training will be derived from performance needs identified by the company, from initial analysis, and from safety regulations. We will evaluate existing materials including documents, manuals, and courses that Wallerich has developed and employed. Content and courses will be checked for accuracy, currency, and effectiveness and updated where necessary. Existing content and effective courses will form the foundation of our efforts to capitalize on previous investments and decrease development time and costs.

B. Design and Development of Instruction and Performance Supports

We will use information collected in analysis to target specific aspects of each topic for training. We have initially identified three potential training methods: classroom training, simulations, and on-the-job training. In addition to the three training methods, this section describes a framework for the design and development of training and support systems.

Training Methods

Table 2 presents an initial outline of sample skills within each of the six identified training topics, the proposed training method, and the anticipated training time.

Table 2. Proposed type and length of training for sample skills within each topic.

Topics	Trainees	Sample Skills	Training Type & Components	Training Length
Accident prevention and investigation	Employees	<ul style="list-style-type: none"> ▪ housekeeping ▪ identifying unsafe conditions and corrective actions ▪ reporting 	<ul style="list-style-type: none"> ▪ classroom with simulation ▪ job aids ▪ manuals 	1 day
	Managers Supervisors	<ul style="list-style-type: none"> ▪ housekeeping ▪ identifying unsafe conditions and corrective actions ▪ reporting ▪ conducting job safety analyses ▪ performing safety audits ▪ developing and implementing supportive management systems 	<ul style="list-style-type: none"> ▪ classroom with case studies/example applications ▪ job aids ▪ manuals 	4 days
Ergonomics with back injury prevention/safe lifting	Employees Managers Supervisors	<ul style="list-style-type: none"> ▪ performing movements in a correct and safe manner 	<ul style="list-style-type: none"> ▪ classroom with demonstration and application ▪ on-the-job training/coaching with certified instructors 	2 hours
Fall protection	Employees Managers Supervisors	<ul style="list-style-type: none"> ▪ identifying fall hazards ▪ using fall protection equipment 	<ul style="list-style-type: none"> ▪ classroom with demonstration and simulation by certified instructors 	2 to 4 days
Eye protection/safety	Employees Managers Supervisors	<ul style="list-style-type: none"> ▪ identifying importance ▪ identifying when protection is necessary ▪ identifying type of eye protection necessary for specific hazards 	<ul style="list-style-type: none"> ▪ classroom ▪ job aids 	2 hours
Emergency and disaster preparedness	Employees	<ul style="list-style-type: none"> ▪ prevention (fire, etc.) ▪ protection ▪ evacuation 	<ul style="list-style-type: none"> ▪ classroom ▪ emergency and disaster simulation exercises ▪ manuals 	8 hours
	Managers Supervisors	<ul style="list-style-type: none"> ▪ identifying necessary supplies ▪ building and executing evacuation plans ▪ building search techniques 	<ul style="list-style-type: none"> ▪ classroom ▪ emergency & disaster simulation exercises ▪ manuals 	2 days

Hearing conservation, respiratory protection	Employees Managers Supervisors	<ul style="list-style-type: none"> ▪ identifying when hearing protection is necessary ▪ identifying consequences of failing to use hearing protection ▪ identifying when respiratory protection is necessary ▪ identifying what type of protection is necessary ▪ maintaining respiratory devices ▪ identifying consequences of failing to use respiratory protection 	<ul style="list-style-type: none"> ▪ classroom ▪ job aids ▪ videos ▪ manuals 	2 hours
CPR, First Aid, and AED training	Employees Managers Supervisors		<ul style="list-style-type: none"> ▪ classroom with certified instructors (partner with American Red Cross) 	6.5 hours

Classroom Training. Classroom training will be provided for skills that require demonstration and hands-on practice or involve some aspect of attitude change. Because employees know each other well, the face-to-face environment will allow them to interact and discuss issues related to safety. Topics and skills such as appropriate eye protection, hearing conservation, respiratory protection, CPR, and First Aid are suited to classroom demonstrations with appropriate instructional media and materials for practice. We will also partner with certified instructors who can tailor instruction on topics such as fall protection, CPR, First Aid, and AED training. These partnerships will allow us to provide courses more cost-effectively and in accordance with the Occupational Safety & Health Administration (OSHA) regulations.

For example, a training module regarding fall protection might start with a video clip showing a tree falling while a worker is cutting another tree. After the video, the trainer would question the learners about which potential hazards they might expect to see in the next video clip (e.g., a throwback, lodged tree, widowmaker, etc.; for more details, see the [OSHA](#) official site). The employees would then discuss possible accidents based on their experiences, with the

trainer facilitating. Then, the employees might view a clip in which a worker is injured by a throwback hazard, followed by clips demonstrating proper actions to avoid accidents. After the discussion and video demonstrations, trainees would learn how to differentiate and predict a variety of potential hazards and how to react to them to eliminate possible damage.

On-the-Job Training. On-the-job training will allow employees to develop mastery and fluency for skills performed regularly. The topic of ergonomics, for instance, with skills such as moving in a correct and safe manner, is well suited to on-the-job training. Coaches can provide employees with real-time feedback on the correct form for repetitive movements specific to their jobs. Additional materials including job aids and checklists will be developed to supplement on-the-job training and support performance.

Simulations. On-the-job training provides the benefit of real-world practice and feedback. However, it is difficult and potentially hazardous to train employees on safety procedures in the actual environment. Simulations provide learners an environment in which to identify safe and unsafe behaviors and conditions and allow employees to practice skills that may occur infrequently on the job. Accident prevention and investigation skills such as identifying hazards and corrective actions are suited to simulation training, as the simulation will allow trainees to address unsafe conditions without being directly exposed to hazards. Computer-based simulations will also allow employees to access training and engage in practice at each site at convenient times. Appendix A includes screenshots illustrating a computer-based simulation for identifying hazards in the workplace.

Framework for the Design and Development of Training Modules

Instructional strategies will emphasize a problem-centered approach specifically targeted toward the job environments of Wallerich employees. Instruction will involve active learner engagement and

allow employees to practice with real-world scenarios (Merrill, 2007). We will place particular emphasis on established instructional elements in accordance with Merrill's (2007) First Principles: demonstration of new concepts and procedures, application of new knowledge to representative problems, engagement of learners in whole-task practice, and integration of newly acquired knowledge and skills into the work environment (see Figure 1). In the sections that follow, we describe and provide specific examples of how we will apply these principles to safety training at Wallerich.

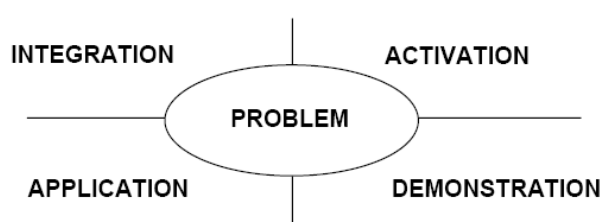


Figure 1. Phases of effective instruction (Merrill, 2007) will be incorporated into the design of all Wallerich safety courses.

Principle 1: Problem-centered (Let me do the whole task!). Each course in the new curriculum will involve authentic situations that employees may encounter on the job. Centering training on *relevant problems* allows employees to make the decisions they will need to make in the workplace. For example, training in accident prevention may involve a simulated situation in which a specific hazard occurs and immediate action is necessary. Rather than simply informing employees of the required actions to take, training will actively engage them in identifying hazards, taking corrective action, and receiving timely and relevant feedback on their performance.

Principle 2: Activation (Where do I start?). Our courses will help employees recall and apply their prior knowledge to enhance their learning of new material. For example, training might start with a video showing a work site with a specific hazard. The video will initially *activate* prior knowledge, and the trainer will encourage discussion and sharing of experiences

with similar hazards, potential consequences of hazards in the workplace, and actions that should be taken. After discussing familiar hazards, the trainer will focus learning on unfamiliar hazards, consequences, and solutions. We will build strategies directly into our materials to help trainers engage learners in conversations that effectively activate prior knowledge.

Principle 3: Demonstration (Don't just tell me, show me!). Courses will include rich media that *show* what the employees need to learn rather than simply describe it. Training in skills such as CPR and First Aid will include demonstrations by certified instructors. Other media such as video or computer-based demonstrations will model correct behaviors before employees are asked to apply those behaviors during practice sessions. Demonstration of incorrect behaviors will also be employed to highlight common errors and consequences.

Principle 4: Application (Let me do it!). Employees will *apply* knowledge and skills as they are learning, rather than waiting until training is over. Most opportunities will be provided through simulation, which will allow employees to experience unsafe conditions in a safe, simulated environment; require them to react properly; and allow them to receive feedback.

Principle 5: Integration (Look what I can do!). Employees will *integrate* the skills, knowledge, and attitudes they have gained into their workplace and community. Other system components can help employees reflect on and integrate skills and knowledge into both their work and personal lives. These components may include community safety campaigns highlighting Wallerich's approach to safety, safety fairs recognizing the success of Wallerich employees, and recognition for involvement in safety processes. Additional systems to support safe performance are described in the following section.

Systems

Continued safe performance demands continual analysis and evaluation. Therefore, training in and enforcement of safe behaviors is only part of the solution. The second aspect of creating a safe workplace involves

- (a) understanding when and why employees engage in safe or unsafe behaviors; and
- (b) creating a work environment that supports safe behaviors.

We understand that Wallerich already employs several performance support systems, which may include observation and feedback processes and active goal-setting, as well as review and recognition of progress toward goals and goal attainment. However, the analysis involved in designing and developing training and support systems often uncovers potential areas for improvement. We will work with Wallerich to identify components that should be developed or improved, and we will involve personnel at every level of the organization to ensure that the safety system is accepted and embraced (McSween, 2003). We describe several potential support components below.

Safety Support Committees. We recommend developing a steering committee including representatives from each work site to direct and support change processes (Roughton & Mercurio, 2002). This committee will include a consultant, support managers, supervisors, and workers. All committee members will have specific roles and responsibilities in

- setting goals based on OSHA regulations and on specific needs of the organization;
and
- managing measurement (evaluation), feedback, and incentive systems.

The consultant or external evaluator will work with committee members to plan and develop system components and assist in conducting both formative and summative evaluation.

Several employees will also be selected by supervisors or fellow employees to serve on the committee for six months. Selection may be based on records of safe behaviors, in order to serve as a form of recognition for safe performance. At the end of this period, involvement will rotate to other employees to maximize participation.

In addition to this organizational safety committee, we recommend that specific safety teams including both employees and members of management be created at each work site. The role of each safety team will involve observing safe and unsafe behavior and conditions, setting goals, and implementing action plans specific to their work sites (McSween, 2003).

Providing employees at all levels of the organization with opportunities and mechanisms to influence the design and operation of safety programs will serve as a clear signal from management that employee input is desired and taken seriously, increasing motivation to implement safety components (Rougton & Mercurio, 2002).

Goal-Setting and Objectives. The overall goal defined by Wallerich is to become the world's safest logging and production facility. We propose setting an ultimate goal of zero incidents. However, this goal can only be reached through the gradual attainment of smaller, achievable, yet challenging goals for each work site. Goals will be formulated and prioritized based on data gathered from incidents and near misses in the last three years and identified through both company data and employee input.

Specific, measurable objectives will be derived from these goals. These objectives will be behavior-based rather than outcome-based to focus on the ultimate reasons for incidents—unsafe behaviors and work conditions. These goals and objectives will be stated in positive terms: everyone in the organization will work toward increasing safe behaviors and conditions rather

than working toward a decrease in incidents, just as they work toward increasing production and quality (Geller, 2001).

Measurement Systems. Measurement systems will be developed for functions at each level of the organization and will include both performance and outcome measures. At supervisory, management levels, and employee levels, performance-based measures will be used.

Measures at supervisory and management levels will focus on

- following and enforcing safety regulations
- conducting regular safety meetings
- maintaining equipment

At the employee level, measures will focus on

- following safety rules
- reporting hazards and injuries
- participating in safety activities

Performance measures have several advantages over outcome measures, including flexibility, ability to measure positive safety activities, ease of implementation, and use in providing immediate feedback on performance. Therefore, outcome measures will be used only for top management (Roughton & Mercurio, 2002). These measures may include

- incident rates
- workers' compensation costs

Measurement systems will be specifically aligned with goals and developed with employees and supervisors at each work site to identify those measures most relevant to their specific sites.

Feedback and Incentive Systems. The safety support committee will develop feedback and incentive systems based on performance measures and will implement them in each work

site. Feedback will be directly aligned with measurement systems and goals. Formal feedback and incentive systems may include company-wide incentives such as certificates, salary increases, recognition programs, and insurance benefits. However, we will also work with Wallerich to promote the development of informal feedback and incentive systems, which can also have a significant impact on safe performance.

Informal Systems. Informal systems derive from the everyday behavior of managers and employees providing feedback on performance. An informal system that is conducive to a culture of safety involves open and non-threatening exchanges between employees and managers. Fostering an environment that is open to suggestion and improvement and that does not punish employees for bringing safety issues or incidents to the attention of management will allow this type of open community to develop, where safety issues are seen as important to everyone in the company and all employees have responsibility for each other. Incorporating employees at all levels of the organization during stages of analysis, design, development, and evaluation, while targeting those individuals who hold influence and power to affect change, will aid in development of this informal safety culture. These steps will help safety become a true company value that is consistently and automatically employed.

C. Evaluation of Training and Performance Supports

Results of the training and performance support systems will be evaluated according to Kirkpatrick's 4 levels of evaluation (Kirkpatrick, 1998).

Level 1: Reaction

Employee reaction encompasses attitudes toward the safety program. It is important that employees value training and find it worthwhile, as this is one factor in the success of the program (Kirkpatrick, 1998). Surveys will be used to measure how well employees enjoyed each

course and how relevant it was to their needs (Parry, 1997). These measures will be collected immediately after employees have completed a training session.

After performance support systems have been in place for a period of three months, questionnaires will be distributed to all employees to determine how well they perceive the supports to be working and whether they propose any changes to the current systems.

Level 2: Learning

Measures of learning will include psychological factors related to safety, including employee beliefs, attitudes, values, and perceptions, as well as employee ability to perform safe behaviors that have been trained (Kirkpatrick, 1998; Parry, 1997). Pre-tests will be given at the start of each training session to measure baseline performance. Post-test data will be collected immediately after training to measure learning and will be used to revise training materials and strategies (Parry, 1997).

Three months after performance support systems have been in place, questionnaires will be distributed to all employees, which focus on employee perceptions of safe behavior and the support of safe behavior in the organization (Parry, 1997; Zohar, 1980). These measures will help determine the effectiveness of the safety programs.

Level 3: Behavior

Change in behavior relates to actual performance on the job (Kirkpatrick, 1988). Measures will include peer observation, self-report measures, and incident analysis to uncover the causes of incidents involving breakdowns of performance support systems or lack of training. Measures of organizational policies and operating procedures and safety management system audits will be used to analyze situational factors influencing behavior change or the lack thereof.

Level 4: Results

The fourth level of evaluation will determine what company-wide changes have occurred as a result of the program. Measures will include an analysis of the number and severity of incidents, time away from work, and direct and indirect program costs and savings (Kirkpatrick, 1988).

D. Implementation, Maintenance and Renewal

We will work with Wallerich to implement a self-renewing system that involves continual monitoring, reporting, evaluation, and revision of training and performance support systems. Analysis, design, development, and evaluation form an iterative process that will help ensure continued improvement in safety performance and results.

CONCLUSION

Our proposed solution to meet the Wallerich Company's safety training and performance improvement goals includes not only analysis, design, development, and evaluation of instruction, but also development and continual evaluation and revision of systems designed to support safe performance in the workplace. Figure 2 provides an overview of our proposed solution.

Several critical aspects support achievement of Wallerich's goals. First, an emphasis on both instruction and performance supports eliminates gaps between learning and actual performance. Second, the combination of classroom, simulation, and on-the-job training grounded in Merrill's (2007) five principles enhances the practicality of the training, promoting transfer to on-the-job performance. Third, the integration of various systems, driven by an internal safety support committee, enables Wallerich to continue maintenance and renewal of its safety effort. Extended maintenance and renewal will help ensure that program components are

effective in producing measurable, company-wide results. Fourth, comprehensive evaluation (Kirkpatrick, 1994) allows measurement of the impact of training and support systems at individual and company-wide levels. Finally, formal and informal systems promote safety as a company and community-wide value, and produce a true safety culture at Wallerich.

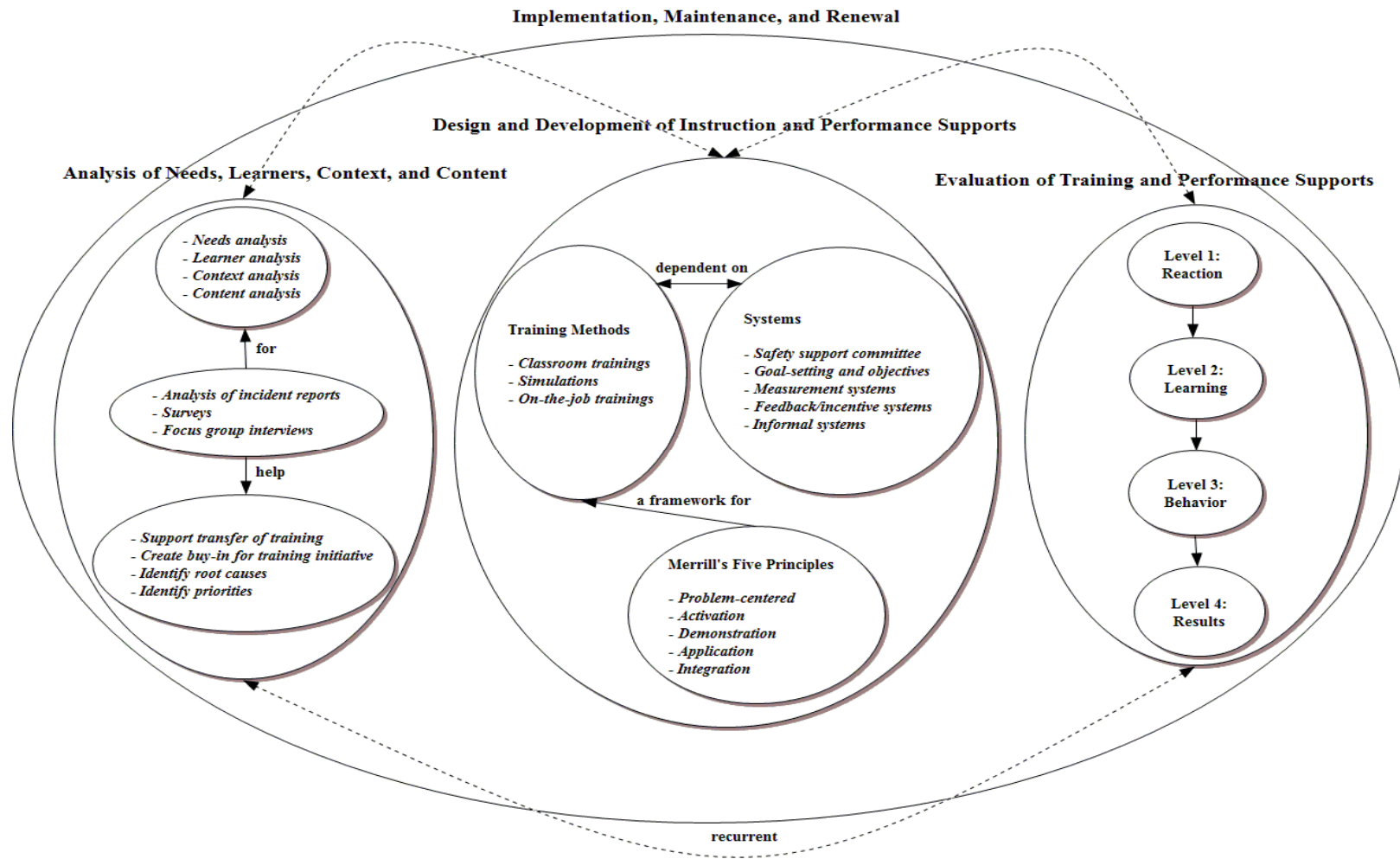


Figure 2. Overall structure of the proposed solution

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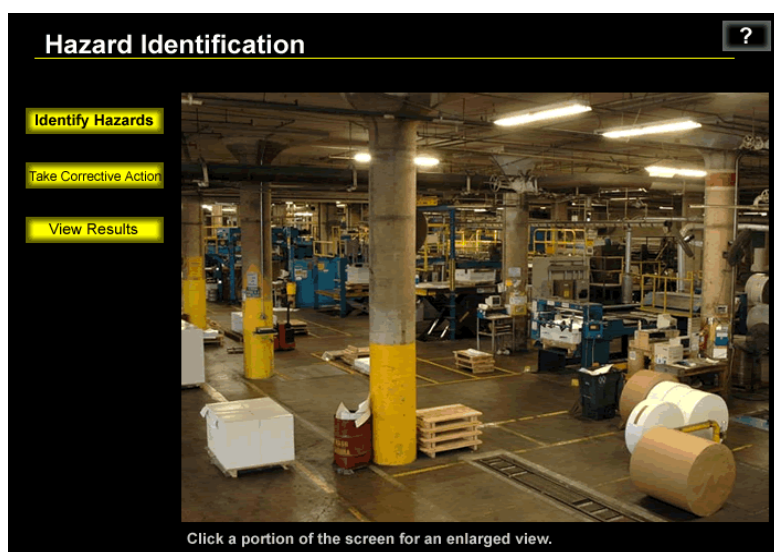
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Appendix A. Hazard Identification Training: Example of Computer-Based Simulation

The following screenshots illustrate an example of simulation-based hazard training. The simulation provides an interactive environment in which the learner is able to practice identifying hazards and taking corrective action. Learners receive specific feedback on their performance. In the 'Identify Hazards' environment, the work area displayed includes a number of hazards learners identify by clicking on specific areas of the screen. After learners have identified hazards, they 'take corrective action' appropriate to the identified hazard and receive feedback on their decisions.



The photo used in this example was retrieved from www.casepaper.com

