THE ANALYSIS OF THE HCS DEPARTMENT’S
INJURY AND ILLNESS PREVENTION PROGRAM

by

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ABSTRACT

The Horticulture and Crop Science department had created their own Injury and Illness Prevention Program (IIPP) which was placed online using Cal Poly’s “PolyLearn” module. The program had just been created and generally covered some of the basic IIPP elements required by CalOSHA law, however it had various points of improvement to fulfill all IIPP regulations. It was found that the program content was not in compliance with CalOSHA laws regarding hazard inspection, training, and record keeping, but through meetings with the various department staff, these areas were brought into compliance with CalOSHA requirements, or are expected to be soon.

Also, the effectiveness of using this online module to communicate the program’s various elements was unknown. Thus an analysis was performed, through meetings with the program’s main users, to gauge its effectiveness. The online module’s ability to communicate safety information was found to be an easily accessible resource for the students/faculty/staff to find applicable training/informative safety documentation.

Finally, a cost comparison was performed showing the cost differences between the estimated IIPP creation cost, the HCS department’s potential liability level, and the effect of a potential Worker’s Compensation claim on the University’s WC Premium rate. It was found that the lowest cost of all three compared values was the estimated cost to create an IIPP. This data was used to show the monetary benefits of investing in an IIPP versus the legally assumed liability without.
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INTRODUCTION

According to the United States Bureau of Labor Statistics’ 2011 National Census of Occupational Injuries, of the 4,609 fatal work injuries, 2 out of every 5 were due to transportation incidents, 11% of those were due to tractor overturn, and an additional 11% of the total workplace fatalities were due to slips, trips, and falls (Bureau of Labor Statistics 2012). Since America’s industrial revolution, safety in the workplace has become heavily regulated and standardized to increase the number of employees returning home from work to their families, and to reduce the amount of time an employee spends out of work due to a preventable injury. The U.S. Department of Labor has created the Occupational Safety and Health Administration (OSHA) to regulate health and safety laws, for all industries, and to reduce workplace injury frequencies. California, however, has elevated this workplace safety and health regulation to another level with the creation of The Department of Industrial Regulations, and CalOSHA, the state’s own safety regulating entity more stringent than federal OSHA. The laws set forth by CalOSHA apply to all industries in the state, both public and private, and are stringently enforced with random surprise inspections, severe fines, and the power to shut down a business completely. Agriculture is one specific area these laws target, due to its high injury rates, including government run agricultural entities such as California Polytechnic State University’s Horticulture and Crop Science department. One of these laws requires all entities to have an Injury and Illness Prevention Program (IIPP) implemented, and enforced. Cal/OSHA defines an IIPP as: “a basic written workplace safety program… to improve the safety and health in your workplace and reduces costs by good management and employee involvement (DIR 2013b).” Currently, Cal Poly’s HCS department has the framework for a minimalist IIPP in place; however, the program needs substantial improvement to fulfill all of DIR’s legal requirements. This project will be the analysis of the Injury and Illness Prevention Program for Cal Poly’s HCS department.
LITERATURE REVIEW

To properly understand the development of accident prevention programs in the United States, you could begin by analyzing the time when machines began to replace hands, and light bulbs allowed manufacturers to operate 24 hours a day. During these developing times, worker safety, in some cases, was placed on the back burner behind production and some ruthless employers created dangerous working conditions, calling for legal regulations.

Before the First World War, at the turn of the century however, workplace injury awareness was presented in journals such as “The Factory Inspector,” a publication that depicted workplace “horror-stories.” The steel industry, as reported by the United States Department of Labor (USDL), “produced some of the most violent accidents that this journal reported (OSHA 2009).” The two following paragraphs are summaries of actual accounts published by “The Factory Inspector,” summarized by the USDL relating to the steel industry:

“At a steel mill in Butler, Pennsylvania, a heavy pot of hot metal spilled molten steel onto wet sand, causing a huge explosion which destroyed part of the plant. Streams of hot metal poured down on the workmen, engulfing and literally cooking some of them. Four men died and 30 more were injured. The explosion shook buildings in the town and caused panic among the populace. Thousands turned out to watch the huge fire that ensued.”

“Two employees at a steel plant in Youngstown, Ohio were sent to clean out the dust underneath the blast furnaces. Suddenly there was a slippage of tons of molten fuel and ore inside the furnace, causing large amounts of very hot dust to fall on them. One of the men was completely buried in it and died in great agony. The other escaped with severe burns (OSHA 2013c).”

Another publication, produced by the Russell Sage Foundation, called the “Pittsburg Survey,” brought to public light the statistically dark side of America’s industrialization within the steel, mining, and railroad industries. The survey reported 509 workmen injured in a three month period, and that the employers believed 95% of all accidents reported were due to “worker carelessness.” However, upon further investigation by Crystal Eastman in her book, Crystal Eastman’s Work Accidents and the Law, 30% of the blame was placed solely on the employer, and only 44% could be “partially blamed” on the victim or fellow workmen, leaving room for speculation on the real cause of these accidents (OSHA 2013c). In response to the increasing amount of these publications, and as documented in the Department of Labor’s “Progressive Era Investigations,” in 1908 the United States Steel Corporation formed a company-wide “Central Committee of Safety” to improve the corporation’s working conditions and incorporate new safety devices. This committee performed inspections, set rules for the plants, and invested
nearly $750,000 a year to improve equipment and working conditions for their employees.

While these publications were very influential to manufacturing industries, the agricultural industry continued to slip underneath the radar of accusations and investigation. The nation knew agricultural work involved long hours of hard labor and dangerous equipment, but most of the attention focused on new and growing industries involving manufacturing plants. Also, the majority of agricultural operations were conducted within families or close friends not nationwide corporations, thus the reporting, documentation, or publication of accident records were seldom performed. Thus, agriculture needed a special group of people to inform, instruct, and design safe work practices to improve the effectiveness and ease of their work.

The Second World War, a global event, brought to light the ultimate effect of accidents in the agriculture industry as experienced farmers and equipment operators left to serve in the armed forces, or work in war equipment production factories. This exodus of operators thinned the experienced agricultural workforce and required fewer people to operate more pieces of machinery. This often placed inexperienced urban individuals behind the wheel of dangerous rural equipment. The posters shown below in Figure 1 are examples of posters distributed during the 1940’s and 1950’s promoting the volunteering of youths in agriculture to help harvest, as found on RarePosters.com (U.S. Second World War Posters: Food Conservation 1945).

![Figure 1. Youth Recruiting Poster Examples.](image)

In Derek Oden’s, “‘Selling Safety: The Farm Safety Movement’s Emergence and Evolution from 1940-1975,’” he discusses the federal realization of farming safety hazards and their ultimate effect on food production. A U.S. National Safety Congress (NSC) study conducted in 1943 brought to light 37,000,000 man-days of labor in 1941 that were lost due to farm accidents, and “that the entire wheat crop of the United States, or half the potato crop, could be produced with this amount of labor (Oden 2005).” Oden also references President Roosevelt’s desire for agricultural safety training due to the increase
of inexperienced and young workers entering the industry. To communicate the message effectively he connected farm safety with patriotism:

“The careless farmer who gets injured in an accident this year not only hurts himself and his family, but he curtails the nation’s Food for Freedom program (Oden 2005).”

Thus the concern for agricultural safety was growing rapidly, as was its communication. Taking advantage of the “malleability” of young minds, cooperative extensions from the National Safety Congress administered safety programs and ideals to youth organizations, such as the FFA (Future Farmers of America) and 4-H groups nationwide. In 1940, the Service Director of the “National Committee on Boys and Girls Club” described the youth as, “still plastic [moldable] …receptive to ideas…enthusiastic…and can convey the messages back to mom and dad where grown-ups can’t,” displaying how young Americans can help promote safe agricultural practices, or simply live out the developing safety measures (Oden 2005). The NSC capitalized on this newfound resource of American youths by providing safety oriented activities for adolescents within their communities. Specifically, in 1952, the “Iowa’s Rural Fire Prevention” program invited young FFA and 4-H members to participate in fire inspections, financially backed by insurance companies, Iowa Fire Prevention Association, and local radio stations. The focus of this program included inspections of their own and neighboring farms for fire hazards, in which the youth’s yielded “…5,605 inspections, located 4,920 hazards and removed 2,802 of them (Oden 2005).”

Eventually, the NSC worked with the USDA to establish “Farm Safety Week” and an annual “Institute of Farm Safety Meeting” in 1944, becoming the first nationally coordinated campaign to improve public awareness of agricultural safety (Oden 2005). This, “Farm Safety Week,” federally enforced campaign was quickly followed by the appointing of state chairmen, directing their state’s safety activities, and coordination of large institutions such as the USDA, the War Food Administration, the National Grange, the American Farm Bureau Federation, and the National Farmers Union, all helping to promote and disperse safety publications to rural Americans. This newly promoted ideal of safe farming practices became so prevalent, even Coca-Cola jumped in to incorporate farm safety messages in their nation-wide advertisements during the 1950’s. The annual Institute of Farm Safety meeting also took deep national roots incorporating farm safety experts, agricultural engineers, USDA officials, and agricultural implement manufacturers to reduce the dangers associated with farming. These annual meetings turned into multiple-day events covering topics such as: fire hazards, proper use of farm chemicals, and electrical fence installations, showing the growing interest in a large breadth of safety concepts (Oden 2005).

To more accurately personify the dangers of farming, these meetings, and activities experimented with the use of large, dynamic visual aids. Pioneering this concept, the University of Nebraska’s agricultural engineers staged one of the first tractor tipping demonstrations in 1953, attempting to acquire a deeper personal investment from their audience (Oden 2005). Purely the attendance of over 20,000 farmers, standing in the hot summer sun, with demands for more demonstrations in other states, showed how well
these dramatic visual tools engaged rural farmers over the conventional small tractor models.

The increasing popularity and respect of these annual “Institute of Farm Safety” meetings, led to the creation of an autonomous, non-profit organization, “The National Institute of Farm Safety,” better known as NIFS, in 1962. The organization’s first president, Norval Wardle, took the brave approach of maintaining separation from the NSC, and focused on the development and promotion of Farm Safety as a profession. He implemented policies for exclusive membership in NIFS such as: exclusive devotion to the safety profession, or previous employment for at least five years as a safety specialist to develop this new profession. Such policies created a seemingly prestigious group of “specialists,” and ruled out many rural experts with valuable experience, a trait many citizens despised. However, as Oden writes, “…most farm safety specialists confirmed their support for a separate organization, quickly joining the organization after incorporation.” This exclusivity, while expected to be the new organization’s Achilles heel, contributed to the programs recognition as an intelligent entity, encouragement to publish academic articles, development of college farm safety classes, and requests to bring their collective expertise to improve other safety organizations (Oden 2005).

The new development of the “farm safety specialist” through the 1960’s as a profession laid the foundation for the Occupational Safety and Health Act (OSHA) in 1970, which created a federal agency dedicated to establishing and enforcing safety laws. This new organization became the federal safety enforcement entity, with the authority to inspect, monitor, and fine employers who did not abide by their set standards. Occupational safety had now been elevated from a recommended practice to a federal standard with legal consequences, as explicitly stated in the OSHA Act’s Section 5. “Duties:”

(a) Each employer --

(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;

(2) shall comply with occupational safety and health standards promulgated under this Act.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct (CalOSHA 2004).

However, this government entity was not solely focused on agriculture, as many other smaller organizations were, and faced challenges of limited resources when spread across the entire nation’s broad range of occupations. Oden writes, “Morton Corn, OSHA’s Assistant Secretary, declared that of the organization’s [OSHA] 100,000 inspections, less than 2% were done in an agricultural setting.” Also, many of the early regulations instituted pertained to farmers who hired employees, thus the small family farm was not
under their immediate jurisdiction, leaving much of the agricultural work force out of reach (Oden 2005). The establishment and application of this federal agency, however difficult and infantile it was, displayed the nation’s attitude shift from lackadaisical to imperative regarding farm safety and employee protection measures.

As a provision to amend the concentration issue, under the federal OSHA Act of 1970, Section 18. “State Jurisdiction and State Plans,” each state was provided the opportunity to create their own governing safety plan. The proposed plan had to be put in writing and submitted to the Assistant Secretary of Labor, overseer of Occupational Safety and Health, with the following requirements:

1. Designates administration responsibility to a specific state agency or agencies.
2. Permits the development and enforcement of new safety or health standards that are at least as effective as federal standards.
3. Provides warrant for the inspection of all workplaces not subject to notice.
4. Delegates effective qualified personnel the legal authority to enforce set standards.
5. Assures adequate funding for administration and enforcement of standards.
6. Assures state will maintain program to apply to all employees of state’s public agencies.
7. Defines state employers subject to report directly to OSHA Secretary as if state plan were not in place.
8. Requires state employers are to report information to OSHA Secretary as he or she may demand from time to time (CalOSHA 2004).

The approval of the state’s plan was ultimately up to the federal Secretary’s judgment and on May 1, 1973, under Assistant Secretary George C. Guenther, “The California State Plan” was approved and published (OSHA 2009). While the plan was approved, Guenther had to monitor and ensure all said developmental steps were taken, and just over four years later the plan was certified on August 19, 1977 (OSHA 2013a).

This new program, commonly known as CalOSHA, conforms to federal OSHA standards, and is administered by California’s Department of Industrial Relations (DIR) which had been established in 1927 to ease 1920’s labor issues (OSHA 2013a). While the state of California was now responsible for the maintenance and application of their own safety plan to all public and private industries, The Division of Safety and Health (DOSH) still remained the program’s enforcement agency within the state. This group remains intimately involved with the CalOSHA program, and effectively enforces safe work standards excluding: federal employees operating within the state, private sector employees operating on Native American land, and maritime workers. These workers, aside from public employees on Native American land, are subject to the laws and regulations of the federal OSHA plan rather than the CalOSHA plan (OSHA 2013a).

The most influential agency in the state, regarding safety standards, is the Occupational Safety and Health Standards Board (OSHSB). As stated on the USDL website:
"This [OSHSB] is the only agency in the state authorized to adopt, amend or repeal occupational safety and health standards or orders. In addition, the Standards Board maintains standards for certain areas not covered by federal standards or enforcement (OSHA 2013a)."

Thus, the OSHSB is accountable for the regulations put forth in the state’s plan, ensuring they are equally or more rigorous than the federal standards, forcing California’s regulations to go above and beyond the federal regulatory umbrella (OSHA 2013a). Alongside the OSHB is the “Division of Industrial Safety”, the agency put forth by California’s DIR containing 27 groups of specified industries or general hazards ranging from construction to explosive materials.

Finally, under “Group 3. General Plant Equipment and Special Operations,” laws specific to agricultural equipment are presented, ranging from Beet trucks to Ladders, providing more stringent operating standards than federal OSHA. As an example to show the specificity of regulations set by California’s DIR, a regulation to prevent operator tripping during sheep shearing, requires that the canvas laid on the floor be staked down at regular four foot intervals to prevent the rugs gathering or bunching (CalOSHA 1985).

To clarify the previously stated agencies and regulations enforcing laws in the state of California, the following Figure 2 diagrams the significant agencies and regulation areas pertaining to this project.

![Figure 2. Hierarchy of California Agencies and Regulations](image-url)
Many farm owners living within the state have and currently complain about state safety standards hindering their productivity or that they are too restrictive to operate a farm efficiently, and may attempt to ignore the regulations. However, effective as of July 1, 1991 California’s DIR signed into law:

“every employer shall establish, implement and maintain an effective Injury and Illness Prevention Program (CalOSHA 1991)

To unilaterally enforce safety measures, while California encouraged a safe working environment, all public and private employers, were now subject to law requiring a written safety plan titled “Injury and Illness Prevention Plan,” commonly abbreviated to IIPP (CalOSHA 1991). This document has eight main areas of regulation including: Responsibility, Compliance, Communication, Hazard Assessment, Accident/Incident Investigations, Hazard Correction, Training/Instruction, and Recordkeeping.

While the DIR requires this for all employers within the state, they have acknowledged the complexity involved in legal document composition, and have uploaded a written template program with blanks where an individual company can input their specific information. In addition to this template document, they have made an interactive webpage with “fill-in” boxes on each topic for users to input their information. This interactive webpage effectively facilitates the composition of this legal document by providing the correct order of information, proper formatting, and ensures all eight areas of the program are directly addressed. As depicted below, Figure 3 is a direct screenshot from the DIR website showing the “fill-in” boxes with explanations, and Figure 4 is the corresponding section of the template document, denoting with the same numbers where the information input on the website will be inserted to the document (DIR 2013b) (DIR 2013c).

![Figure 3. DIR website “fill-in” boxes for IIPP composition](image-url)
California Polytechnic State University, San Luis Obispo currently has an IIPP program written and published by their Office of University Risk Management (RM). The program is available online, and covers the entire university as a whole. However, as stated in the program, responsibility is delegated to different groups for the various aspects of campus safety:

**University Environmental Health and Safety** – “Representative members of the University Community will review and make recommendations regarding safety policies and procedures…” (CP A&F 2008).”

**Office of Environmental Health and Safety (Risk Management)** – “It is the responsibility…under the guidance of the [Campus Safety & Risk Management] Committee, to develop and manage an effective Injury and Illness Prevention Program (CP A&F 2008).”

**Deans, Directors, Department Chairs, Department Heads** – “It is the responsibility … to develop departmental procedures to ensure effective compliance with the Injury and Illness Prevention Program and other university health and safety procedures as they relate to operations under their control (CP A&F 2008).”

Citing these statements in Cal Poly’s university-wide IIPP, individual departments are required to develop specific safety plans according to their operations. Currently, the Horticulture & Crop Science (HCS) Department of Cal Poly State University, which has some very specialized hazards such as pesticides and crop-specific harvest equipment, has a basic framework in place for their departmental program. This framework however, needs substantial improvement to effectively cover some specific and hazardous operations, from harvest machinery to lab equipment. To grasp the detail and scope of each category within the IIPP, and how it applies to the HCS department it is necessary to reference the regulations stated under CalOSHA Section 3203: “Injury and Illness Prevention Program.”
The first topic of an IIPP, must clearly dictate who is responsible for the enforcement, maintenance, and availability of the program. Making a committee or individual responsible for this incentivizes someone to, as stated in Figure 3, “[for your IIPP to be effective you must fully]... put it into practice in your workplace (DIR 2013a).” This section also incorporates the name of the company, and the location which the written program can be found.

The second aspect of the program puts in place a system of compliance from the employees to the program, through disciplinary action and employee recognition. Ensuring compliance with the program, from all company personnel, is necessary for the program to be worth anything more than its value in paper. As stated by DIR, “Include a system for ensuring that employees comply with safe and healthy work practices (CalOSHA 1991).”

A “Whistleblower” is a common term used in business policy vocabulary, and is defined by the State of California as, an employee who discloses information about a state or federal statute being broken by their employer, including unsafe working conditions or work practices (Division of Labor Standards Enforcement 2013). The next category of the IIPP, “Communication,” ensures that an employee can report a hazardous condition without fear of employer reprimand or employment degradation. To encourage reporting and ensure security of the notifying employee, anonymity is legally required, but a clear description of the problem must be provided. As stated by the DIR and Cal Poly EH&S:

“Substantial compliance with this provision includes... a system of anonymous notification by employees about hazards... (CalOSHA 1991).”

“Managers and supervisors will encourage employees to report any unsafe or unhealthful conditions they discover without fear of reprisal (CP A&F 2008).”

The “Communication” aspect of the program must also include the scheduled interval between safety meetings, ensured training programs, and informative postings to both the employee and employer (CalOSHA 1991).

Workplace hazard identification by the employees is a great way to keep an eye on working conditions, but California’s DIR requires documented periodic inspections to be performed by a specifically responsible person or agency, and that a series of detailed procedures be followed to ensure its effectiveness. A “Hazard Assessment Checklist” is required, and must be specialized toward your operations or working environment (CalOSHA 1991).

In nearly all work environments, especially when heavy equipment is involved, an employee can make an error and cause an accident. The DIR covered the investigation of these accidents/incidents with the short clause, “Include a procedure to investigate occupational injury or occupational illness (CalOSHA 1991).” Cal Poly’s EH&S committee expanded on this by requiring all injuries to be reported to immediate
Supervisor who is responsible for the completion of the injury report form, and a serious injury must have the proper form completed and turned into EHS within 48 hours. To further define “serious injury,” the program reads:

“[a serious injury]…is any injury or illness which requires inpatient hospitalization for a period in excess of 24 hours for other than medical observation or in which an employee suffers a loss of any member of the body or suffers any serious degree of permanent disfigurement (CP A&F 2008).”

Once a hazard has been identified, whether by anonymous notification, periodic checklist inspection, or by a reported incident/accident, employers are required by federal OSHA law, California DIR law, and Cal Poly university policy to document the observed hazard and correct it in a timely manner. DIR describes the procedures for an “imminent hazard” as the removal of all employees from the hazard area, gathering the necessary employees to amend the apparent hazard, and providing all necessary safeguards for amending hazard work (CalOSHA 1991). The EHS committee delves deeper into the severity of hazards, and classifies the priority of a hazard in a table as shown in Figure 5 below:

<table>
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<th>Order of Priority</th>
<th>Consequence (Severity)</th>
<th>Probability of Injury Occurrence</th>
</tr>
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<tr>
<td>1</td>
<td>Imminent danger exists. Capable of causing death, possible multiple deaths, widespread occupational illness and loss of facilities</td>
<td>Probable</td>
</tr>
<tr>
<td>2</td>
<td>Severe injury, serious illness, property and equipment damage</td>
<td>Reasonably Probable</td>
</tr>
<tr>
<td>3</td>
<td>Minor injury, illness or equipment damage may result</td>
<td>Remote</td>
</tr>
<tr>
<td>4</td>
<td>First aid care.</td>
<td>Extremely Remote</td>
</tr>
</tbody>
</table>

Figure 5. Cal Poly IIPP Table 1: Hazard Classification Guide.

EHS also calls for a written notice to be posted on a hazardous piece of equipment to prohibit its use, and if this notice is ignored and the equipment remains in use, the program states, “[person/s] are subject to severe disciplinary action, up to and including, dismissal as allowed by campus policy and respective collective bargaining contracts (CP A&F 2008).” This statement shows the university’s willingness to take action, if
necessary, to remove a hazardous employee from the university and maintain a safe
working environment for all employees, students, visitors, faculty, and staff.

Writing procedures, creating a program, and choosing someone to enforce it are only the
beginning aspects of an IIPP. Effectively training your workers to operate in accordance
with the rules set forth by OSHA and DIR is necessary for an effective safety program.
Safety training for all employees is also required by university policy when performing a
task for the first time or beginning work in general, whether it be in an office or a
processing plant. DIR requires training events when the program is first established, to all
new employees, to an employee performing a task for the first time, when new
equipment, processes, or substances are introduced to an employee, when the employer is
informed of a new hazard, and to inform supervisors of the regulations they are to uphold
(CalOSHA 1991).

Given the increase in Spanish speaking workers in agriculture, effective training has run
into language barriers, and still faces them today. In 1990, a group of businesses,
educational institutions, and government entities came together to form an organization to
improve agricultural safety techniques called “AgSafe.” This organization meets
annually, and in 2010, the Journal of Agromedicine, under the leadership of Dr. Barbara
C. Lee, analyzed mechanisms to knock down these language barriers amongst training
materials presented at the AgSafe convention. They noted that out of the roughly 100
Spanish-speaking attendees of this conference, 10 percent were assigned the task of
implementing and enforcing their company’s safety programs in the field (Lee 2010).

The training materials, according to Lee, strictly avoided colloquial Spanish verbiage to
improve the perceived authority of the content. However, they noticed the difficulties of a
uniform language amongst Spanish speaking workers with the dialect variance between
individuals. Also, the documents utilized real photographs instead of cartoons or
drawings to change the documents’ tone from suggestive to authoritative, as Lee states,
“some conventional cartoon characterizations are subject to cross-cultural
misinterpretation (Lee 2010).” The response of improving perception and authority of
training materials to the growing Spanish-speaking concentration of workers in California
shows how dedicated and careful employers are when regulating safety in the workplace.

The university’s training covers a broad range of training topics from blood borne
diseases to ergonomic injury prevention, and states the training programs are available
through EHS to meet “safe work practice requirements.” Cal Poly also mandates,

“Specialized training sessions dealing with an employee’s unique job
assignment must be developed by each supervisor. It is the responsibility
of each supervisor to understand his/her employee’s job tasks and related
hazards (CP A&F 2008).

This directly requires all university supervisors to learn the hazards of the employees
work and to create supplemental training materials. Fortunately, an interview with Mr.
David Ragsdale revealed, “LearnerWeb Online Training” modules have been introduced
through Cal Poly’s online portal called “MyCalPoly,” and allows a supervisor to assign training materials to an employee. “LearnerWeb” provides a broad range of training topics, shows which topic was assigned, the date assigned, shows course completion progress, and allows monitoring of the time it took the employee to complete the training. This online module also keeps a detailed record of the training performed by the employee, thus fulfilling DIR and OSHA record keeping regulations (Ragsdale 2013).

While the use of machines instead of hands can reduce the amount of time spent on a task, the difficulty or strain a task places on an individual’s musculoskeletal system can be reduced with ergonomics. This is where the study of ergonomics serves workers with tool engineering and testing to facilitate the strenuous work of operating certain equipment. OSHA defines ergonomics as, “the science of fitting workplace conditions and job demands to the capabilities of the working population (OSHA 2013b).” Thus an ergonomically designed tool fits the employee and their human capabilities to increase comfort when working and offers short/long-term health benefits. As an example, Susan Kotowski, in the Journal of Agromedicine, performed a study for a more ergonomic or employee-friendly wheelbarrow, specifically for youths. Kotowski attached a “lumbar motion monitor” on the back of the testing subjects to measure their level of exertion, and compared these levels between a conventional wheelbarrow and a prototype design with three wheels and a push bar. The study found that giving the wheelbarrow a push bar for aid over bumps, and three wheels to help balance heavy loads helped relieve lower back stress for the wheelbarrow operator (Kotowski, Walters and Davis 2009). Figure 6 shows the wheelbarrow and testing device on the individual’s back.

![Figure 6. Prototype Wheelbarrow Design.](image)

This prototype design provided little reduction in lower back injury risk, but showed an increase in injury awareness amongst the test subjects, an accomplishment in its own. This also serves as an example to show how the study of ergonomics combines youth workers and agriculture, while maintaining safety as a priority. These youth workers are the foundation on which future farming operations will operate, so an increase in their awareness of safety will continue to serve future generations to reduce the frequency of musculoskeletal disorders (MSDs).
PROCEDURES

PolyLearn Evaluation Procedure

The IIPP in place had to be evaluated within the requirements of CalOSHA, and Cal Poly’s IIPP, thus the first step was to research the legal requirements stated by both. After gathering this information, the “HCS Department Safety Program” was scrutinized to verify the necessary details were included. If the information on the PolyLearn page did not satisfy the minimum requirements of either entity’s information, the PolyLearn page was updated. This evaluation procedure was done for each of the following categories of the program: Responsibility, Compliance, Communication, Hazard Assessment, Accident/Incident Investigation, Hazard Correction, Training/Instruction, and Record Keeping.

PolyLearn Effectiveness Evaluation Procedure

To evaluate the effectiveness of using an internet based module as the foundation for a safety program, the program had to be used and tested by the employees and students of the department. This usefulness test began at the end of Cal Poly’s Winter 2013 quarter, March 2013, upon completion of the program’s framework, and ended during Cal Poly’s Winter 2014 quarter, February 2014. To gather data on the effectiveness of the program, meetings were held with department staff members to discuss the effectiveness and make adjustments accordingly.

Cost Analysis Procedures

To analyze the costs of creating a Safety Program, information was gathered regarding the costs to create an IIPP and compared to the total costs of a workplace injury. The following assumptions were made regarding the amount of time spent in the following areas: 40 hours of program creation, 10 hours per week for training, four hours per week of training, and 1 hour per week making program adjustments all over a one-year period. Finally, an assumed hourly wage of $14.00/hour was used to calculate the annual cost of creating and maintaining an IIPP. To gather costs for a workplace injury and Worker’s Compensation, meetings were held with Risk Management officers, and valid, current data was gathered on the workers compensation cost, and the departments insurance deductible level.
RESULTS

Upon review of the PolyLearn page, addressing responsibility in the HCS Department Safety Program, there are two coordinators mentioned, one for the campus and the other for the department. David Ragsdale, Director of Cal Poly’s Environmental Health & Safety, is the campus coordinator, and Dr. Scott Steinmaus, HCS interim department head, assumes responsibility for the department’s safety program (HCS Department 2013). This fulfills OSHA and EH&S requirements of an individual responsible for the enforcement, maintenance, and availability of the program. Regarding PolyLearn effectiveness, the use of this online resource was determined to be very effective by providing employees and students access to the contact information for questions or concerns regarding safety.

Compliance with the program is not a section directly addressed on the HCS PolyLearn page. To fulfill the requirements, a link to the University’s IIPP was uploaded to the PolyLearn page. This document references the Employee Handbook for disciplinary procedures, but it was determined to be inappropriate to include the actual Employee Handbooks on the PolyLearn page.

The HCS department was found to use the university’s system of anonymously reporting workplace hazards, by means of an online submission form linked to their PolyLearn page. However, there is no scheduled interval between safety meetings declared on the page. Regarding informative postings and training programs, the department has effectively uploaded and referenced students to the correct documents and training manuals on the PolyLearn page (HCS Department 2013).

Under the HCS PolyLearn page section “Hazard Inspection and Correction” a link provides direct access to a web page with three inspection checklists provided by Cal Poly’s Administration and Finance Department. The three checklists for the various hazard inspection types include: “General Office Safety,” “Laboratory Safety,” and “Shop Safety (CP A&F 2012).” The PolyLearn also provided an online archive of previously performed inspections, but it was determined through meetings and discussion to be unnecessary information for student access, and the archive was thus removed. This archive was replaced with an updateable chart of inspection records only including the location of inspection, who performed the inspection, and the date the inspection was completed. Pertaining to the PolyLearn’s effectiveness, the small spreadsheet kept on the website was determined to be an effective way of ensuring regular inspections, as well as providing the students with a record of when the facilities they use were inspected for hazards. A minimum inspection interval, as recommended by the EH&S committee, was found to be quarterly, but the university leaves this interval length up to the discretion of the department, which has not currently been incorporated into the HCS Department Safety Plan (CP A&F 2008).

The HCS Department Safety Plan clearly addresses accident/incident reporting at the top of the page with a link to the university’s standard form, and simple instructions. The link provided on the PolyLearn page takes the user to the Risk
Management page with the primary option to define the incident parameters to involve a vehicle, a student/visitor, a university employee, or property damage. After this parameter selection, the website moves to the page of procedures, who to report it to, and downloadable forms (HCS Department 2013).

Hazard correction is another piece of the safety program not directly mentioned on the PolyLearn page. Through discussion and after deciding to keep records of hazard inspection checklists in their appropriate building, it was agreed upon to simply write the “Facilities work order number” on the checklist when the hazard is identified and reported to facilities. When this is done, and the hazard inspection checklist is kept on file, the record of taking measures to correct the hazard has been officially documented. Upon investigation of the HCS department program’s training, a lack of training records was apparent. The difficulty of training, and documentation was brought to light due to varying schedules between students and supervisors. The LearnerWeb online based training modules were suggested as a training and documentation method to fulfill these requirements, but the department staff members did not have the authority to assign online training modules to the students. No agreement was reached regarding a structured training and documentation method. This lack of employee training and documentation places the department out of compliance with applicable regulations.

The following table provides the data gathered regarding an estimated cost to create a Safety Program.

<table>
<thead>
<tr>
<th>Task</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>PolyLearn Creation</td>
<td>$560.00</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Weekly Meetings</td>
<td>$2,912.00</td>
<td>$2,912.00</td>
<td>$2,912.00</td>
</tr>
<tr>
<td>Training</td>
<td>$7,280.00</td>
<td>$7,280.00</td>
<td>$7,280.00</td>
</tr>
<tr>
<td>Updating PolyLearn</td>
<td>$728.00</td>
<td>$728.00</td>
<td>$728.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$11,480.00</td>
<td>$10,920.00</td>
<td>$10,920.00</td>
</tr>
</tbody>
</table>
The following tables include information regarding Cal Poly’s Workers Compensation costs and insurance deductible level for each department complimentary of Cal Poly’s Risk Management members David Carrol and Debbie Rice.

Table 2. Record of Cal Poly State University’s Workers Compensation Costs.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiscal Year</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WC Premium</td>
<td>$2,063,925.00</td>
<td>$1,819,205.00</td>
<td>$1,701,031.00</td>
<td>$1,666,991.00</td>
</tr>
<tr>
<td>Cal Poly's Experience Modifier</td>
<td>114.28%</td>
<td>103.74%</td>
<td>99.26%</td>
<td>99.26%</td>
</tr>
<tr>
<td>Cal Poly's Cost per $100 of Payroll</td>
<td>$1.28</td>
<td>$1.17</td>
<td>$1.12</td>
<td>$1.09</td>
</tr>
<tr>
<td>CSU Cost per $100 of Payroll</td>
<td>$1.14</td>
<td>$1.19</td>
<td>$1.12</td>
<td>$1.10</td>
</tr>
<tr>
<td>No. Claims/Year</td>
<td>101</td>
<td>91</td>
<td>85</td>
<td>95</td>
</tr>
<tr>
<td>Average Cost/Claim</td>
<td>$20,434.90</td>
<td>$19,991.26</td>
<td>$20,012.13</td>
<td>$17,547.27</td>
</tr>
</tbody>
</table>

Insurance Deductible per University Department: $250,000.00
DISCUSSION

Pertaining to responsibility, both parties responsible are clearly identified and their contact information is included, however, the location of the written program is not included because the program will be completely accessible to students enrolled in the HCS program or courses online through a PolyLearn page. This puts the HCS program in compliance with University and State requirements. Also, this is an excellent way to provide contact information to the students and staff under the program, thus the PolyLearn resource is effectively used to spread information quickly and easily.

Enforcing the rules in place, as well as future regulations, must be done in the HCS department because it would create a sense of responsibility amongst employees, or provide recognition to employees who value safety thus creating examples for other employees. While it is not directly addressed on the PolyLearn page, the university’s IIPP references the campus “Employee Handbook” as the location of disciplinary actions if regulations are not followed. This reference works as a tool for the university, and it was decided in meetings with the staff members to be inappropriate to include this information on the PolyLearn page because the information does not pertain to the students who have access to the program. Also, the “Governor’s Safety Award Program,” an annual program administered through the California State University System Risk Management Office, is mentioned in the university’s IIPP to include the recognition of safe employees requirement, thus encouraging compliance amongst department employees (CP A&F 2008). This encouragement is suggested by California’s DIR, thus the HCS program is in compliance. Once again, the online basis of this program facilitates the dispersion of key safety information specific to the department, deeming the PolyLearn an effective resource in this area.

The communication of safety training information between the students and staff is imperative for the department, especially when using pesticides and equipment, and as reported by staff members, the PolyLearn page was a “great” way to relay information to the students. This means of dispersing information reduces paper use, saves time for the staff members, and allows the students to view safety information before and after the training is done. While it was reported that the department experienced difficulty with students accessing forms correctly, it was ultimately determined to be a more efficient means of communicating with students during their extremely diverse schedules.

The department’s use of anonymous hazard reporting online was seen as unnecessary by the staff members initially because the students came directly to them in the past. While this shows the positive working relationships between staff and students, the department would not be in compliance with DIR and University standards. The online form, supplied by Cal Poly, makes the providing of all personal information optional, and the department has included a fake email address to submit when filling out the form as an example. Thus the link on the PolyLearn page fulfills the legal requirements, and effectively provides the students with an easy and accessible way to expose hazardous workplace conditions undetected by the hazard inspectors.
The hazard inspection checklists provided by the university are extensive, and some items included do not apply to the HCS department’s operations making the use of these cumbersome and time consuming. There is a need for a unit specific checklist to cover, in detail, the special aspects of each piece of equipment, shop tool, and lab tool. Through meetings and discussion with the department’s staff, it was made apparent that a more applicable checklist was being developed. However, due to the magnitude of corrections necessary the process stopped. It also became apparent that there is a significant amount of work necessary to bring the department’s facilities and equipment in compliance with state standards. Finally, the lack of a concrete inspection interval takes the department out of compliance with Cal Poly and California regulation.

The HCS department has accident/incident investigation covered effectively on their PolyLearn page. This piece of the program did not require an invention of forms or procedures. It is simply a link to Cal Poly’s existing page with all necessary information for reporting an accident/incident. This is the best example of how effective an online based program can be used in a university setting with internet access virtually anywhere. In the event of an injury, where panic is often present, one can reach this form on a computer or smart phone and fill out the necessary information very quickly. This accessibility is vital for timely reporting of accidents.

Taking measures to correct the hazards once they are identified will be vital to the safety of the workplace for both students and staff. Currently, the way hazards are supposed to be corrected is by filing a “facilities request” to the Facilities and Maintenance department of the university. This is done online, and is not included on the PolyLearn page because it is available on the “my.calpoly.edu” access of everyone enrolled or employed by Cal Poly.

Working within a company on an 8:00 to 5:00 schedule where you have a specific job makes training easy because people are in the same place at the same time. However, in organizations similar to Cal Poly where schedules vary from one person to the next, scheduled training times are difficult to make and enforce. Despite this difficulty, regulations on federal, state, and university levels require employees to be trained before they begin work, and for this training to be documented. Currently the HCS department lacks training records, and structured training intervals placing them out of legal compliance. However, with the use of LearnerWeb online training, the training records can be kept online for each employee. While the department staff involved in the discussions did not have the authority to assign these modules, the ability to perform and document basic training can be done online. This is not done on the PolyLearn, but the availability for an employer to train their employee is present.

Regarding the training of students not employed by the university, the PolyLearn provides an online database where an instructor can upload an electronic copy of a pamphlet, defer their students to the appropriate document, or have them return for a quick quiz. This is one way currently being used by the department staff for pesticides, and an efficient way of distributing the training materials, thus making this online based program advantageous and effective.
Finally regarding the costs of a program, the information gathered brought to light a substantial difference between the cost of developing an IIPP and the potential cost due to an injury lawsuit. While it cannot be guaranteed that a safety program will prevent a lawsuit and immunity of the department, the potential for the blame to rest on the department and its faculty/staff members can be significantly reduced. For example, if a student or visitor was driving a tractor and the individual were to fall off and severely injure themselves, an investigation into the HCS department and equipment could follow. If investigators found no training documentation on tractor driving, no equipment inspection documentation, the tractor did not have a seatbelt, or the individual testifies that a HCS supervisor asked them to operate the tractor despite these circumstances, the HCS department will be solely responsible for the individual’s compensation up to the first $250,000 dollars. During the lawsuit, the prosecution could also inform CalOSHA of the matter which could lead to substantial fines of which the department is responsible. Also, dependent on the severity of the accident, the HCS staff member who ordered the student to operate the tractor could face criminal prosecution.

The previous situation provided however only applies to students and visitors. If the individual would have been an employee of the department, whether student assistant, faculty, or staff, Worker’s Compensation would have covered the compensation costs. While this may seem like a relief of high costs to the department, it may actually significantly increase the Worker’s Compensation premium, potentially leading to greater long term costs. This one injury, dependent upon its severity, can increase the Experience Modifier, a determining factor of the final WC Premium rate, greatly. However, we will use a conservative example of a 1% increase to show how significant of a change this may bring to the University’s cost. The cost to create an IIPP was calculated to be $11,480 (Table 1), while the Worker’s Compensation increase came to be an estimated $15,293.49 (Appendix A), nearly a $4,000 difference. Thus when comparing the alternative of a Worker’s Compensation increase against the cost to create an IIPP, the IIPP still remains the cheapest option from a monetary standpoint.
RECOMMENDATIONS

The most important recommendation would be for the staff members to agree on a permanent interval for safety meetings. It was reported that regular safety meetings were being held to further develop the program immediately after it was opened, but the department staff quickly became overwhelmed with the process and stopped meeting. Developing a safety program does not happen quickly, and it will take perseverance to continually improve and maintain a safe working environment in the department for staff members and students.

Pertaining to the safety program’s communication, it is highly recommended that the department staff include all HCS students and employees to access the PolyLearn page. The larger the amount of people who view the program and use it, the more safety conscious the department will become.

The process of trimming the inspection checklists would greatly improve the ease and effectiveness of hazard inspections, and it is recommended that the department personnel take the time to create individual lists one time. This one time of arduous work would provide the department with a clear inspection checklist, and would facilitate future workplace inspections. The checklist and actual record of inspection should be kept in the building to which they apply while the public record is simply kept on the PolyLearn page. Workplace inspections are imperative for faculty, staff, and student safety while working, and it is required by state, and university law. The first inspections will bring to light the issues which need attention, and when corrected, future inspections will become quick and simple. To complement the specified inspection checklists, it is also recommended to set a concrete interval for inspection. This would bring the department into compliance with regulations, as well as provide the staff members and employees of the department with a less hazardous working environment.

An obvious need for extensive training documentation is also present. It is recommended that the staff members discuss and define a concrete method for documenting training of the student employees as well as the students. This will not be an easy task, but maintaining the risk of prosecution or an individual being hurt because of improper training creates an unsafe working environment for the faculty, staff, student assistants, students, and campus visitors.

Failure to document training, hazard inspections, and hazard corrections could leave the department with significant legal fines and life-changing ramifications for students and department staff. Therefore it is also highly recommended that the HCS department begin keeping steady records on these matters to protect themselves from financial and operational trouble. The work time lost during this documentation process will be appreciated when a lawsuit threatens to take up to $250,000 from the department.

Ultimately, maintaining a safe working environment for fellow human beings is the most important job of the department staff. Safety is not any single individual’s job, it is the responsibility of every employee and student of the university.
REFERENCES


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Division of Labor Standards Enforcement. 2013. Whistleblowers are Protected. DIR.


Ragsdale, David, interview by Matthew Evers. 2013. Director of Environmental Health & Safety (February).

APPENDIX A

COST CALCULATIONS
COST CALCULATIONS

Injury and Illness Prevention Program Development Cost Estimation

The following calculations show the assumptions made to estimate the cost of creating and developing an IIPP for the HCS department regarding: PolyLearn creation, weekly meetings, training, and updating PolyLearn costs.

**PolyLearn Creation.** It was estimated to require 40 hours over one week at $14.00/hour for an employee to create an IIPP on the “PolyLearn” online module. However, this cost is included for the first year of the program only.

\[
PolyLearn\ Creation\ Cost\ ($) = \left(\frac{40\ Hours}{Week}\right) \times \left(\frac{1\ Week}{1}\right) \times \left(\frac{$14.00}{Hour}\right) = $560
\]

**Weekly Meetings.** Weekly meetings were estimated to require four hours/week, 52 weeks/year, at $14.00/hour for one employee to hold safety meetings.

\[
Weekly\ Meetings\ Cost\ ($) = \left(\frac{4\ Hours}{Week}\right) \times \left(\frac{52\ Weeks}{Year}\right) \times \left(\frac{$14.00}{Hour}\right) = $2,192/Year
\]

**Training.** Training was estimated to require 10 hours/week, 52 weeks/year, at $14.00/hour for one employee to train department faculty/staff on IIPP elements and PolyLearn use.

\[
Training\ Cost\ ($) = \left(\frac{10\ Hours}{Week}\right) \times \left(\frac{52\ Weeks}{Year}\right) \times \left(\frac{$14.00}{Hour}\right) = $7,280/Year
\]

**Updating PolyLearn.** Weekly updates to PolyLearn estimated to be one hour/week, 52 weeks/year, at $14.00/hour employee pay.

\[
Updating\ PolyLearn\ Cost\ ($) = \left(\frac{1\ Hours}{Week}\right) \times \left(\frac{52\ Weeks}{Year}\right) \times \left(\frac{$14.00}{Hour}\right) = $728/Year
\]

**Total Annual Cost.** The total annual cost of the first year includes the total of all previously stated calculations, and subsequent annual costs include all calculations aside from the initial PolyLearn creation cost.

\[
Year\ 1\ Cost\ ($) = PolyLearn\ Creation\ Cost\ ($) + Weekly\ Meetings\ Cost\ ($) + Training\ Costs\ ($) + Updating\ PolyLearn\ Cost\ ($)
\]
Cal Poly Worker’s Compensation Cost Data

The costs provided in Table 2. “Record of Cal Poly State University’s Workers Compensation Costs,” are the real costs paid by Cal Poly University towards Worker’s Compensation provided by Risk Management officers David Carrol and Debbie Rice.

Cal Poly Worker’s Compensation Premium Cost Increase

The following calculations show how a mere 1% increase in the University’s Experience Modifier, which is used to calculate the Worker’s Compensation premium rate, can greatly influence the University’s total cost to provide Worker’s Compensation. The 2013/2014 Worker’s Compensation cost data provided by Cal Poly’s Risk Management will first be used to calculate the total payroll for the university, and the adjusted Experience Modifier will be applied to this value to conservatively calculate the difference.

Cal Poly University Payroll Calculation. The formula, using Cal Poly’s 2013/2014 Worker’s Compensation (WC) Premium Data, to calculate the University’s Payroll is as follows:

\[
WC \text{ Premium} \ (\$) = University \ Payroll \ (\$) \times Experience \ Modifier
\]

\[
\frac{1,666,991.00}{\$100 \ of \ Payroll} = University \ Payroll \ (\$) \times \frac{1.09}{\$100 \ of \ Payroll}
\]

\[
University \ Payroll \ (\$) = \frac{1,666,991.00 \times 100 \ of \ Payroll}{1.09}
\]

\[
University \ Payroll \ (\$) = 152,934,954.13
\]

Cal Poly University’s Adjusted Experience Modifier Calculation. The following calculation shows the Adjusted Experience Modifier with a 1% increase:
\[
\text{Adjusted Experience Modifier} = 2013/2014 \text{Experience Modifier} \times 1.01
\]

\[
\text{Adjusted Experience Modifier} = \frac{$1.09}{\$100 \text{ of Payroll}} \times 1.01
\]

\[
\text{Adjusted Experience Modifier} = \frac{$1.10}{\$100 \text{ of Payroll}}
\]

**Cal Poly University’s Adjusted WC Premium.** The following calculation shows the Adjusted WC Premium using the previously calculated data:

\[
\text{Adjusted WC Premium} = \text{University Payroll (\$) } \times \text{Adjusted Experience Modifier}
\]

\[
\text{Adjusted WC Premium (\$)} = $152,934,954.13 \times \frac{$1.10}{\$100 \text{ of Payroll}}
\]

\[
\text{Adjusted WC Premium} = $1,682,284.49
\]

**Cal Poly University’s WC Premium Difference.** The following calculations show the ultimate cost difference after a 1% increase in the University’s Experience Modifier:

\[
\text{WC Premium Difference (\$)} = \text{Adjusted WC Premium (\$)} - \text{2013/2014 WC Premium (\$)}
\]

\[
\text{WC Premium Difference (\$)} = $1,682,284.49 - $1,666,991.00
\]

\[
\text{WC Premium Difference} = $15,293.49
\]