

2019

Implementing an Injury Prevention Program and its Impact on Warehouse Operations

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Consultancy Project Executive Summary

Organization: Gardner-Webb University School of Education

Project Title: Implementing an Injury Prevention Program and its Impact on Warehouse Operations

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Consultancy Coach: Kevin Goselin

Defense Date: July 8, 2019

Authorized by: Jeff Hamilton, Ed.D.

Amendment History

| <u>Version</u> | <u>Issue Date</u> | <u>Changes</u> |
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| Version #1 | 5/7/2019 | Initial version. |
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| Version #3 | 5/14/2019 | General edits related to legal approval. |
| Version #4 | 7/1/2019 | Final version. |

Approval

This consultancy project was submitted by Michael E. Chapman under the direction of the persons listed below. It was submitted to Gardner-Webb University School of Education and approved in partial fulfillment of the requirements for the degree of Doctor of Education at Gardner-Webb University.

Jeff Hamilton, Ed.D., Faculty Advisor
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Date

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Date

Abstract

Implementing an Injury Prevention Program and its Impact on Warehouse Operations. Chapman, Michael, 2019, Consultancy Project, Gardner-Webb University, Digital Commons/Injury Prevention/Ergonomics/Process Improvement/Continuous Improvement/Warehouse Operations

The implementation of an injury prevention program in the industrial and supply chain setting provides a great challenge within the emerging world of ergonomics and human factors engineering with limited peer-reviewed resources to guide organizational leadership. Building a program that focuses on education, individualistic behavior, and ergonomic engineering has the implications for reducing reported work-related injuries and work-related workers compensation cases and increasing overall workplace production. As provided in the case for ACME (pseudonym), work-related injuries and work-related musculoskeletal disorders were focused on to improve the overall health and well-being of warehouse workers. Concentrating on education and process improvement, with emphasis on injury prevention, led to an overall 51% reduction of injuries reported, while maintaining a 55% increase in overall production capabilities. Not only did the organization see a substantial drop in injuries reported, but the organization also noted a conservative estimate of an 821% return on investment, justifying to all organizational leaders the impact ergonomics and human factors engineering can have.

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1 Introduction

1.1 Project Purpose

ACME is an organization that was founded in 2012, in the city of Louisville KY, with a great deal of impact on retail and supply chain management. The organizational structure maintained an average employee roster of 3,000 warehouse employees, exempt and nonexempt. The organization ran a 24-hour-a-day, 7-day-a-week operation. This organization, with overall success, still reported workplace injuries and workplace musculoskeletal disorders organizational leaders sought to mitigate. The challenges ACME faced required a deep dive into the identification of what causes a musculoskeletal disorder, how to care for these disorders, and how to mitigate the associated root cause. In addition to overall warehouse worker health and well-being, maintaining fiscal responsibility was imperative to the long-term success of the organizational structure. The purpose of the consultancy project was to reduce workplace injuries and incidents reported at ACME by 50% in 3 years.

Key Terms:

Environmental health and safety (EHS). Refers to the field and study of workplace and industrial setting factors that directly impact human and community environment, health, and overall safety.

Occupational Safety and Health Administration (OSHA). Refers to the United States government agency enacted by President Richard Nixon with the mission “to assure safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education and assistance” (“OSHA Mission,” n.d.).

Workplace incident. In reference to ACME, a workplace incident is referred to as any incident type or event that resulted in a soft tissue or musculoskeletal disorder.

Musculoskeletal disorders. Specific to any workplace incident or injury that directly impacts the muscles, joints, or bones of a body.

Recordable. Refers to the OSHA standard for reporting workplace incidents or injuries that require treatment beyond OSHA standards for first aid.

First aid. Refers to OSHA’s and the organization’s standard of first aid to include first aid wound care, cryotherapy, thermotherapy, general massage, active release technique stretching, kinesiotape, and other forms of nonrigid support.

Labor hours. Refers to the total number of warehouse worker hours worked in a given shift, day, week, month, or year to include both exempt and nonexempt employees.

1.2 Associated Documents

There is no additional associated documentation provided with the presentation and discussion with this project.

1.3 Project Plan Maintenance

The project started in March 2016 and continued through the 2018 fiscal year. Programming design was completed by August 2018, and the final data collection occurred in January 2019. Each year, with reference to 2015 as the baseline comparative year, a strategic plan was drafted and presented to the project adviser for review of expectations and progress. This occurred to evaluate the state of the project in relation to overall objectives and goals. Each semester's milestones were submitted with updates to the faculty advisor to ensure progression through the consultancy project.

2 Project Scope

The Project evaluated the organization culture, established educational programming, and provided assistance to the operational leadership as a subject matter expert in the field of human movement, biomechanics, and ergonomic engineering. The project did not assume ownership of standard of work owned by site personnel but served as an enhanced resource for the organization.

2.1 Outline of Partnering Organization's Objectives

2.1.1 Objectives

The overall partnering organization, ACME, sought for the expertise surrounding musculoskeletal disorders and the ability to implement the organization's first injury prevention program. The implementation of the injury prevention program required a detailed organizational cultural assessment, strategic planning session, and continuous improvement reviews to ensure overall goals and objectives were met. These objectives included

- to transition ACME's safety actions and services from reactive to a proactive, preventable program;
- to decrease the total number of warehouse workers injured working for ACME;
- to decrease the total number of reported warehouse workers who need to be seen by a physician for treatment beyond OSHA standards for first aid; and
- to improve or maintain current production rates, while decreasing the overall number of warehouse workers injured while working for ACME.

2.1.2 Success Criteria

Success criteria for Implementing an Injury Prevention Program and its Impact on Warehouse Operations included

- a complete implementation of the organization's first injury prevention and ergonomics program;
- implementation of a new hire orientation education and training program focusing on overall human kinetics, biomechanics, and ergonomics;
- reduction of reported work-related injuries comparing year over year; and
- reduction in the overall number of workers compensation cases reported or requested by warehouse workers.

2.1.3 Risks

Full autonomy was provided for developing and implementing the injury prevention program. Return on investment (ROI) was important to the

partnering organization to ensure the organization remained true to the core value of fiscal responsibility. Risks to ensure project completion included

- no formalized process or procedure for the implementation program at ACME;
- organizational acceptance of the consultant and the adoption of recommendations by operational leadership;
- ability to provide an ROI, with potential termination of the pilot program;
- organizational performance as a customer service provider; if the organization was unable to perform, the project would be at risk of termination; and
- the organization ran on a 24/7 operation; with the risk of the consultant as a key contributor, reaching the entire operation posed difficult.

2.2 Outline of Student's Objectives

2.2.1 Objectives

The project was tasked with launching the organization's first injury prevention program which aligned well with the overall objectives. The development and expansion of a program that increased the health and well-being of warehouse workers proved beneficial for the partnering organization. Long term, this process solidified the overall process and reinforced key principles taught in course work surrounding biomechanics, functional movement, leadership development, culture management, and continuous improvement principles.

Personal goals were identified that focused on technique execution for managing organizational change. The consultant had ownership of the program, project management, and leadership opportunities that strengthened skills with group dynamics, culture change, and feedback modeling.

2.2.2 Success Criteria

The project would be deemed successful if the partnering organization implemented an injury prevention program that improved the health and well-being of the warehouse workers of ACME and reduced the overall reported work-related injuries and incidents by 50%.

2.2.3 Risks

The consultant had an overall understanding of injury prevention and how it related to the human body but had no formal education surrounding supply chain management and the industrial warehouse setting. This was identified as a gap in education and posed a threat to speed and efficiency,

with immediate emphasis on cultural submersion and organizational evaluation.

Risks to the objectives and success criteria included project scope creep, financial continuation, and overall economic impact on ACME.

- Capabilities were realized by the organizational leadership several months into the program with requests for additional project support and additional focus which temporarily derailed the overall objectives of injury reduction.
- Financial continuation was a risk to the overall objectives; if the organizational leadership did not find value added or new leadership assumed control, the potential for change existed.
- ACME is not an organization that is impervious to economic changes and economic impacts. In the event of a negative economic impact, the project or organization in general may not continue.

2.3 Definitive Scope Statement

The Implementing of an Injury Prevention Program and its Impact on Warehouse Operations Project was designed to implement the partnering organization's first ergonomics and injury prevention program focusing on education and engineering solutions. The consultant served as an addition to the EHS team and was not designed to replace or cover previous personnel associated with the team divisions. The consultant served in a standalone position with expertise in musculoskeletal recognition, care, and prevention. Full autonomy was provided with the goal of workplace incidents and injury reduction by 50%.

3 Deliverables

3.1 To Partnering Organization

The following deliverables were provided to the partnering organization with prescribed timelines:

1. Establish an injury prevention program with a focus to reduce the total number of work-related injuries and incidents by 50% by December 31, 2018, with 2015 data as a baseline.
 - a. To reduce the total number of work-related injuries and incidents by 25% by December 31, 2016.
 - b. To reduce the total number of work-related injuries and incidents by 15% by December 31, 2017.
 - c. To reduce the total number of work-related injuries and incidents by 10% by December 31, 2018.
2. To implement the site's first injury prevention program and ergonomics procedure by December 31, 2016.
 - a. To establish and launch site's pre-shift stretching program by July 31, 2016.
 - b. To review, evaluate, and enhance the organization's ergonomics program and Job Hazard Analysis program by December 31, 2017.
 - c. To scale the process path identification project to each job function by December 31, 2018.
3. To design and implement a new hire educational program with a focus on reducing the total number of new hire injuries and incidents by 50% by December 31, 2018.
 - a. To produce a new hire orientation EHS programming by December 31, 2016.
 - b. To educate all new hire trainers on the importance of body mechanics and injury prevention in the workplace by December 31, 2017.
 - c. To train all new hire trainers on safety school enhancements by December 31, 2018.

3.2 From Student

To significantly contribute to ACME by implementing educational and engineering-based programming that would benefit the health and well-being of the overall organization.

To provide the environment to demonstrate the theoretical and practical application of leadership development, cultural management, and injury prevention.

To enhance the ability to learn and apply experiences to the overall implementation of an injury prevention program.

4 Project Approach

4.1 Project Lifecycle Processes

Autonomy was provided with the implementation of the organization's injury prevention program. Organizational integration was first targeted to conduct root cause analysis, identify key stakeholders associated with the change management process, and understand the physical demands of the warehouse worker process paths.

The focus was placed on organizational integration and evaluation for the first 3 months and included

- warehouse integration where the consultant worked throughout the entire operational process path,
- offsite training to understand ACME leadership principles and overall expectations,
- support for each division of the EHS team, and
- organizational integration was targeted to understand the root cause related to injury trends which helped identify key stakeholders associated with the change management process.

2016 – Focus was on organizational integration, cultural assessment, and the new hire orientation process. Understanding the culture of ACME, the organizational jargon, artifacts, and values required monitoring and evaluation. This occurred by collecting inventories, interviews, and questionnaires. To support culture change and with high levels of attrition, the new hire orientation process was targeted to enhance the education and preparation of warehouse workers for the physical demands necessary for the job. This included a new hire orientation surrounding injury prevention and general safety best practices.

2017 – The project focused on the new hire orientation, enhancing the trainers who were responsible for the education of all new hire training. Initial steps towards process evaluation and job hazard risk analysis occurred and are as follows:

- New hire training included several key principles of injury prevention education such as the importance of stretching, hydration, sleep cycles, nutrition, and overall body mechanics.
- Partnered with operational leadership, taking ownership of proposed change safety evaluations, and recommended overall improvements based on ergonomic principles.
- Expanded the known job process path inventory from 36 job processes to 114 job processes, breaking down and evaluating each individual physical demand summary and hazard recognition.

2018 – With mechanisms in place, the organization continued educational programming which included key principles of injury prevention. With these

mechanisms in place, the project focused on engineering solutions associated with high risk and medium risk identified through body mechanics and ergonomic risk factors by

- Processing all change management that was proposed through the consultant for safety evaluation.
- Providing suggestions to operational leadership for station design and process improvement.
- Researching and presenting process mapping techniques designed to guide operational leadership toward ergonomic process improvement plans.

In summation, the overall project objective of reaching a 50% reduction in warehouse injuries led to the design of a 3-part system: educational programming, behavior-based safety, and engineering-based safety.

Educational programming was designed for every level of the organizational structure from the operational leadership to the warehouse worker. Additional programming and curriculum were designed surrounding ergonomics and its impact on warehouse production with the emphasis on human movement and human movement risk and waste.

Behavior-based safety focused on the individual coaching of warehouse associates with both corrective feedback and positive reinforcement. This process was necessary for establishing the effectiveness and adoption of educational programming.

Engineering-based safety has the ability to engineer out human mechanics and ergonomic risk factors associated with job function and job process design. Identification and recommendations took several months to understand but yielded greater results by eliminating the potential for previous risk factors.

4.2 Project Management Processes

The consultant oversaw the development and implementation of the partnering organization's injury prevention and ergonomics program. During the implementation of the injury prevention program, there were several adaptations that were required to change the overall approach to maintain project integrity.

After adopting a safety-related new hire orientation process, the organization's human resource team presented and launched a virtual new hire orientation program at the end of the 2017 and early 2018 year. The introduction of this program removed the new hire orientation process offsite, without the integration of an included injury prevention virtual program. Adaptation to this change occurred and established a new partnership that focused on the education of the site new hire trainers, which led to the development of the "train the trainers" safety programming. This change called for the

modification of the original “plan do check act” (DPCA), acting to deliver the same content through a different avenue.

To manage the overall goal of a 50% reduction of work-related injuries and incidents, the partnering organizational metrics were reviewed following a year over year structure. These data helped to establish a yearly plan of action that was data driven and focused to keep the project on track to the target of a 50% reduction in work-related injuries and incidents. After the 2016 fiscal year, a strategic plan was developed and included a deep dive on organizational injury trends, established actions, and proposed projects to site leadership for review and validation. Each project and program had a required end date of October 31 of each year, which ensured operational leadership an appropriate amount of time to implement and prepare for the Black Friday season, known in the retail structure to be the day after Thanksgiving until Christmas Eve.

Recordability and work-related injuries and incidents go hand in hand, coupled together. The project originally sought to reduce the recordable incident rate as well as the overall incidents reported. As requested by ACME, recordability and recordable incident rates were not included.

4.3 Project Support Processes

For project support, there were several resources that were utilized including the EHS team and operational leadership.

For milestone and implementation of organization-wide projects, the consultant partnered with the site EHS team. For example, the launch of the organization stretching program required training for the team on how to perform routines to cover each warehouse worker found in the 24/7 operation. When faced with a difficult time scheduling training for the entire team, the project adviser arranged meetings and served as a facilitator.

For warehouse chain process improvement, the project partnered with the operational leadership to present ideas and gain buy-in from the operations leader through the continuous improvement cycle, focusing on ergonomic engineering solutions. This occurred by a departmental focus; department categories of inbound, outbound, and quality. The consultant did not have the ability to change operations with the operations leader’s consent and relied heavily on operational leadership for the adoption and implementation of injury prevention programming.

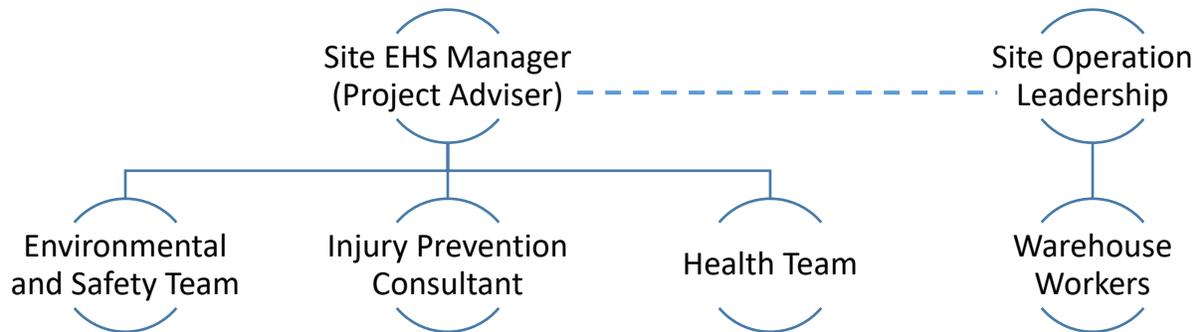
4.4 Organization

4.4.1 Project Team

The consultant was a direct member of the organization’s EHS team, which served as a support function for the supply chain and operational

leadership. The project called for a subject matter expert for change management, process improvement, and biomechanics.

4.4.2 Mapping between ACME and Student



5 Communications Plan

Key Stakeholders include

- director of operations (site lead),
- operational leadership,
- warehouse workers,
- site EHS manager (site adviser),
- site EHS team, and
- director of finance.

| <i>Who- Stakeholder</i> | <i>What Info do they need?</i> | <i>Why do they need it?</i> | <i>When will they get the information?</i> | <i>How will they get the information?</i> |
|-------------------------|---|---|--|--|
| Director of Operations | High level understanding of project scope and expectations. Progress and financial implications. | To understand program and sponsor for continuation. To understand the overall potential and actual ROI. | Initial and yearly. Yearly. | Site Adviser will serve as the liaison between the project and the site leader. This is not due to the site leader's unavailability but serves the overall chain of command. 1:1 meetings were allowed during this process and occurred at minimum once a year, discussing overall project scope. Additionally, the consultant presented numerous times at monthly and quarterly incident mitigation meetings. |
| Site EHS Manager | Intricate level of understanding of project scope and project completion status. | To relay information to key stakeholders who request information on overall purpose of project scope. To ensure proper | Monthly and yearly. Continuous expectation to | Communication, team and 1:1 meetings to ensure full understanding of scope and projects associated. Yearly and monthly status reports. 1:1 engagements. |

| | | | | |
|------------------------|---|---|--|--|
| | Barriers and areas of opportunity. | advisement and guidance towards project completion. | ensure removal of barriers or modification of specific projects. | |
| Site EHS Team | Project expectations, projects, and needed support. | To aid in the implementation and full adoption of the injury prevention programming. | Ongoing, consistent communication. | Emails, team meetings, and 1:1 engagements. |
| Site Leadership | Project expectations support for overall goals. | To serve as an additional resource and to support the change management evaluation process. | Ongoing, consistent communication and as needed. | Emails, team meetings, 1:1 engagements, and overall safety evaluation reports. |
| Site Warehouse Workers | Educational programming surrounding EHS risk factors and mitigation plan. | To educate and enhance the overall understanding of warehouse operations and risk factors found in the workplace. | Ongoing, consistent communication. | Stand up announcements, communication boards, training sessions, group stand downs, and 1:1 engagements. |
| Directors of Finance | Detailed project plan with financial implications. | To support and guide through the ROI process and overall purchase for programming enhancements. | Ongoing, consistent communication. | Emails and 1:1 engagements. |

6 Work Plan

6.1 Work Breakdown Structure

The following are a list of projects and work breakdown associated with the partnering organization project. Included are the resources associated with the work breakdown.

- Launched a Stretching Program (Floyd, 2009; Prentice, 2016)
- Created a New Hire Injury Prevention Training (Blanchard, Ballard, & Finch, 2004; Floyd, 2009; Prentice, 2016)
- Created a New Hire Injury Prevention Train the Trainer (Blanchard et al., 2004; Floyd, 2009; Prentice, 2016)
- Created an Ergonomic Technique Coaching Program (Floyd, 2009; Hamill & Knutzen, 2009; Prentice, 2016)
- Designed and launched an operational leadership continuous improvement through ergonomics training (De Looze, Vink, Koningsveld, Kuijijit, & Rhijn, 2010; Tillman, Tillman, & Woodson, 2016; Tracey, Vonderembse, & Lim, 1999)
- Implemented a Job Hazard Analysis Program (Haight, 2012)
- Enhanced the Job Hazard Analysis Program including ergonomic risk scores (Ayres, 2007; Haight, 2012)
- Established first change management procedure (Denison, 2012; Dubrin, 2013; Hughes, Beatty, & Dinwoodie, 2014; Senge et al., 1999)

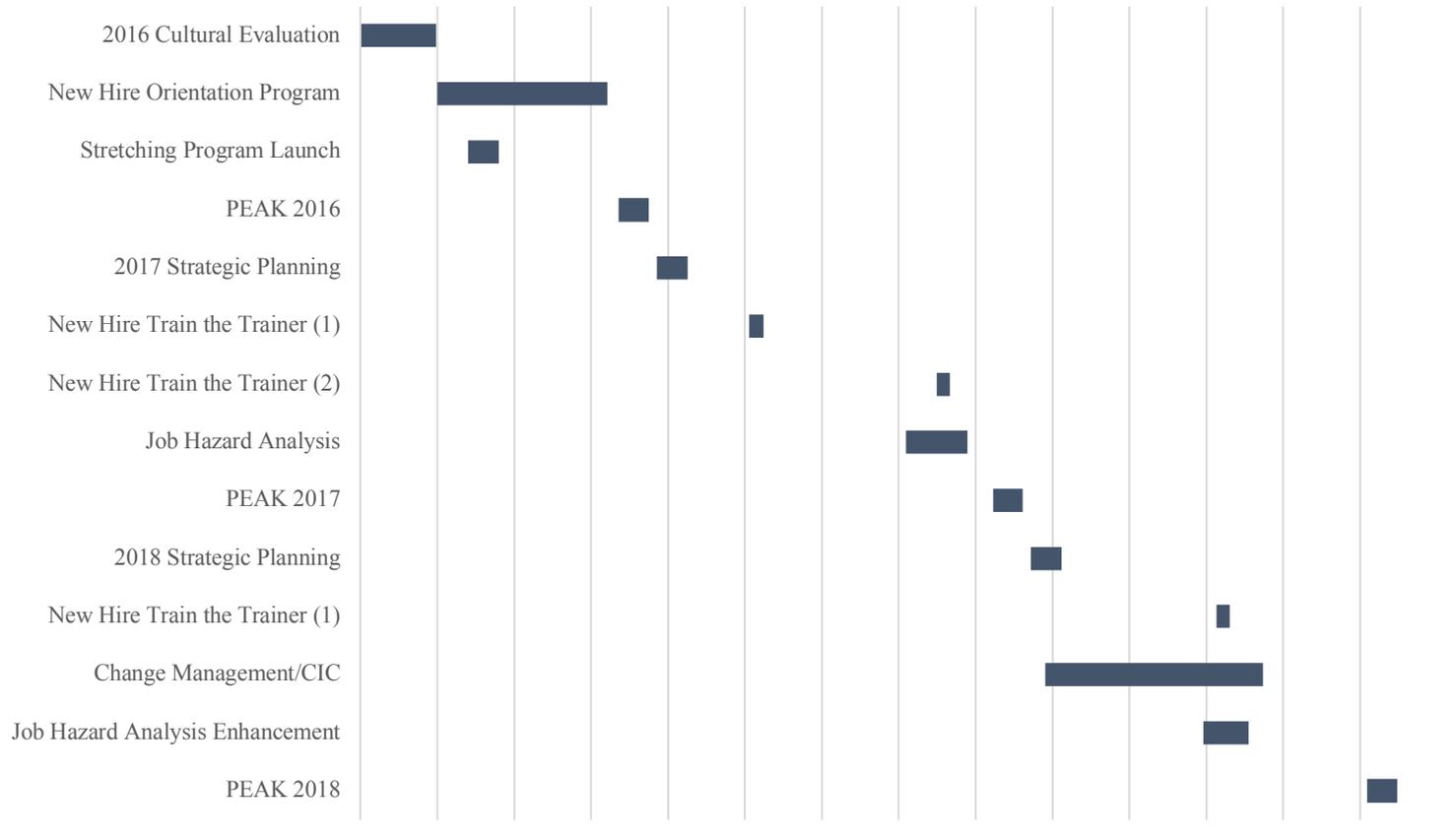
6.2 Resources

| Task | Start Date | End Date | Duration (Days) | Resources |
|--------------------------------------|------------|------------|-----------------|--|
| 2016 Cultural Evaluation | 3/18/2016 | 5/31/2016 | 74 | Tools and resources produced by DEOL Program |
| New Hire Orientation Program | 6/1/2016 | 11/14/2016 | 166 | Labor hours from operations to host orientation program. |
| Stretching Program Launch | 7/1/2016 | 7/31/2016 | 30 | Labor hours from operations to implement and teach stretching program to ALL warehouse workers. |
| PEAK 2016 | 11/25/2016 | 12/24/2016 | 29 | None. |
| 2017 Strategic Planning | 1/1/2017 | 1/31/2017 | 30 | Data metrics and one-on-one meeting times with site leadership and site EHS manager. |
| New Hire Train the Trainer (1) | 4/1/2017 | 4/15/2017 | 14 | Labor hours from operations to teach all trainers. |
| New Hire Train the Trainer (2) | 10/1/2017 | 10/14/2017 | 13 | Labor hours from operations to teach all trainers. |
| Ergonomic Technique Coaching Program | 03/31/2017 | 5/31/2017 | 60 | EHS health team, labor hours, and EHS manager buy-in. Continuous adoption and ownership of EHS health team. |
| Job Hazard Analysis | 9/1/2017 | 10/31/2017 | 60 | Ergonomic assessment tools, paper based and electronic based. No additional cost for tools utilized in evaluation. Stopwatch, photo, and video capabilities. |
| PEAK 2017 | 11/25/2017 | 12/24/2017 | 29 | None. |
| 2018 Strategic Planning | 1/1/2018 | 1/31/2018 | 30 | Data metrics and one-on-one meeting times with site leadership and site EHS manager. |

| | | | | |
|---------------------------------|------------|------------|-----|--|
| New Hire Train the Trainer (1) | 7/1/2018 | 7/14/2018 | 13 | Labor hours from operations to teach all trainers. |
| Change Management/CIC | 1/15/2018 | 8/15/2018 | 212 | Organizational leadership time, stopwatch, time studies, process mapping, and ergonomic risk assessments. |
| Job Hazard Analysis Enhancement | 6/18/2018 | 8/1/2018 | 44 | Ergonomic assessment tools, paper based and electronic based. No additional cost for tools utilized in evaluation. Stopwatch, photo, and video capabilities. |
| PEAK 2018 | 11/25/2018 | 12/24/2018 | 29 | None. |

Implementing an Injury Prevention Program at ACME

Mar-16 Jun-16 Aug-16 Oct-16 Jan-17 Mar-17 Jun-17 Aug-17 Nov-17 Jan-18 Apr-18 Jun-18 Sep-18 Nov-18



7 Milestones

| No. | Consultant Milestones | Completion Date |
|------------|---|---------------------------------|
| 1. | Develop a detailed statement of purpose of the project including a clear and comprehensive problem statement (why it is a compelling need to address) as well as provide background information on the institution's/organization's environment with respect to the purpose of the project. | 2/8/2016 |
| 2. | Develop a list of the deliverables that are expected as outputs of the consulting project. Provide the rationale for the objectives selected including linking the objectives to organizational goals and objectives. | 5/31/2016 |
| 3. | Develop the scope, boundaries, and organizations and processes, and systems (IT and non-IT) impacted. | 5/31/2016 |
| 4. | Develop a detailed outline of a project plan including specific strategies, activities, timelines, responsibilities, expected outcomes, and results (to date) for all phases of the project. | 5/31/2016, 1/31/2017, 1/31/2018 |
| 5. | Track and document overall plan performance. This includes, but is not limited to, actual performance against SMART objectives, actual organizational benefits realized, major issues encountered, and budget performance (actual vs. projection). | 1/30/2019 |
| 6. | Analyze and present overall project findings to operational leadership to include project scope, objectives, results, and financial ROI. | 8/24/2018 |
| | | |
| No | ACME Milestones | Completion Date |
| 1. | Complete new hire assimilation program to include warehouse job function participation and off-site onboarding. | 4/15/2016 |
| 2. | Launch dynamic stretching program for all warehouse workers. | 7/31/2016 |
| 3. | Implement site's first injury prevention program to include scope, objectives, and timelines for partnering organization to include educational programming and ergonomic risk assessments. | 12/31/2016 |
| 4. | Incorporate EHS into the change management evaluation process and ensure measures are in place to detect and mitigate risk before change occurs. | 8/1/2017 |
| 5. | Review, evaluate, and enhance the organizational job function physical demand summaries and hazard recognition requirements. | 12/31/2017 |
| 6. | Establish a continuous improvement plan for operational leadership to address overall risk factors and mitigation plan. | 12/31/2018 |
| 7. | Reduce the total number of work-related injuries and incidents by 50% | 12/31/2018 |
| 8. | Reduce the total number of work-related injuries and incidents of newly hired workers by 50% | 12-31-2018 |

8 Metrics and Results

The performance metrics on the project were based on the original objectives and scope of work, focusing on injury prevention and injury reduction of workplace injuries and incidents. Objectives include

1. Establish an injury prevention program with focus to reduce the total number of work-related injuries and incidents by 50% by December 31, 2018, with 2015 data as baseline.
2. To implement the site's first injury prevention program and ergonomics procedure by December 31, 2016.
3. To design and implement a new hire educational program with a focus on reducing the total number of new hire injuries and incidents by 50% by December 31, 2018.

Metric Descriptors

Injuries reported were data mined through the organization's internal software system. The data themselves are manually entered by the site's medical team after the first report of incident or injury. Injuries were tracked to determine effectiveness of programming and injury prevention implementation.

Recordables were data mined through the organization's internal software system and were maintained by the site's medical team. Recordables occurred either by the referral of first aid cases to a physician or if the warehouse worker requested to be seen by a physician. Recordables are tracked as an indicator of severity following OSHA standards for incident reporting.

Labor hours were collected through the organization's internal software team and were maintained by the site's finance directors. Labor hours are collected and tracked to properly report out, following OSHA standards for incident reporting.

Incident rates were calculated by a formula provided by OSHA, following the standard for industry reporting. The formula includes

$$[\text{Incidents} * 200,000] / [\text{Labor Hours}]$$

Recordable incident rates were calculated by the formula provide by OSHA, following the standard for industry reporting. The formula includes

$$[\text{Recordable Incidents} * 200,000] / [\text{Labor Hours}]$$

Production was collected through the organization's internal software system and was validated by the site's finance directors. Production was collected to track organizational progress towards continuous improvement and to compare the relationship between injury reduction and overall building production at the end of each year.

Production rate was used by dividing production by labor hours to provide a unit per hour basis. This formula is consistent with industry standards and provides an overall review of production increase over time. The formula includes

$$[\text{Production}] / [\text{Labor Hours}]$$

Results

1. Establish an injury prevention program with focus of reducing the total number of work-related injuries and incidents by 50% by December 31, 2018, with 2015 data as baseline **(Complete, Goal Accomplished)**.
 - a. To reduce total number of work-related injuries and incidents by 25% by December 31, 2016.
 - i. Completed 12/31/2016, goal accomplished with a 27% reduction in injuries and incidents.
 - b. To reduce total number of work-related injuries and incidents by 15% by December 31, 2017.
 - i. Completed 12/31/2017, goal not accomplished with only a 12% reduction in injuries and incidents.
 - c. To reduce total number of work-related injuries and incidents by 10% by December 31, 2018.
 - i. Completed 12/31/2018, goal accomplished with a 25% reduction in injuries and incidents.

2. To implement the site's first injury prevention program and ergonomics procedure by December 31, 2016 **(Complete, Goal Accomplished)**.
 - a. To establish and launch site's pre-shift stretching program by July 31, 2016.
 - i. Completed, program launched.
 - b. To review, evaluate, and enhance the organization's ergonomics program and Job Hazard Analysis program by December 31, 2017.
 - ii. Completed, 10/31/2017, all job functions evaluated and programming identification enhanced.
 - c. To scale the process path identification project to each job function by December 31, 2018.
 - iii. Completed 8/1/2018 with the launch of the injury prevention identification template for each job path.

3. To design and implement a new hire educational program with focus on reducing the total number of new hire injuries and incidents by 50% by December 31, 2018 **(Complete, Goal Accomplished)**.
 - a. To produce a new hire orientation EHS programming by December 31, 2016.
 - i. Completed 6/1/2016 with successful launch of new hire orientation process and adopted by organizational leadership.

- b. To educate all new hire trainers on the importance of body mechanics and injury prevention in the workplace by December 31, 2017.
 - i. Completed 4/1/2017 with the development and execution of the train the trainer programming.
- c. To train all new hire trainers on safety school enhancements by December 31, 2018.
 - i. Completed by 7/1/2018 with enhancement and delivery of EHS train the trainer programming.

Success from the partnering organization was met if the organization implemented its first injury prevention program.

- The goal of a 50% reduction in work related incidents and injuries was met after the implementation of the partnering organization's first injury prevention program.

The overall figures will not be released by ACME; however, below illustrates the percent change year over year. The project resulted in an injury reduction of 51%, 55% increase in operational production, with a decrease in labor hours of 21%. In addition, the site saw a reduction in injuries reported from new hires (classified as 0-6 months of service) drop by an average of 56%.

| YOY | Units | Hours | U/Hr | Incidents | NH I% | IR |
|---------------|------------|-------------|------------|-------------|-------------|-------------|
| 15/16 | 21% | 4% | 14% | -27% | -68% | -34% |
| 16/17 | 5% | -12% | 19% | -12% | -59% | 2% |
| 17/18 | -2% | -14% | 15% | -25% | -43% | -13% |
| Change | 24% | -21% | 55% | -51% | -56% | -42% |

9 Risks, Constraints, Assumptions

9.1 Risks

| Risk Description | Mitigation and Contingency Plan to Risk | Impact to Consultancy Project | Likelihood of Occurrence (Low, Medium, High) |
|---|---|---|--|
| Timeline risk, with potential to take a greater amount of time impacting the education of 3,000 people. | Impacting 3,000 warehouse workers with a higher attrition and onboarding rate increases the chance for project risk. To mitigate this risk, with an end goal of 2018, each year was evaluated for progress and reviewed by site leadership, providing a 2016, 2017 and 2018 after-action review. If progress was not considered, a project evaluation and scope occurred. | Without this mitigation plan and thought for contingency plans, the project would have failed. Continuous improvement and continuous feedback on performance was essential to meeting the overall needs of the partnering organization. | Medium |
| Performance risk, if project was unable to meet the expectations of partnering organization. | <p>To mitigate this risk, the project immediately integrated operational leadership focus into injury prevention and ergonomic engineering solutions to benefit two of three areas: safety, production, and quality. If the programming or proposed solution met two of these three criteria, overall objectives were met. This was important to understand key constituent concerns and identify projects beneficial to the organization and well-being of all warehouse workers.</p> <p>Consultant pursued outside certifications in Functional Movement and Ergonomics to enhance education for immediate application to project.</p> <p>PDCA principles were incorporated into every injury prevention project to collect both subjective and objective data to ensure value added programming.</p> | If the project was deemed to not meet expectations or overall project goals, termination of project could have occurred. | Low |
| Change in operational leadership could shift the | Organizational leadership turnover, at times, was | Project scope change or discontinuation could prolong the | High |

| | | | |
|---|--|--|--------|
| scope, direction or need for project. | unpredictable with employees leaving for additional opportunity, promotions, or terminations. Developing a strategic plan was imperative to this project to provide deliverables to partnering organization and to relay ROI for current project scope. | overall organizational goals and increase the chance of project failure. Structuring the project and following through with the continuous improvement cycles in check will mitigate chance for project impact. | |
| Strategic risk: the deep dive, data analysis and data-driven decision-making that drives the overall project. | To mitigate the chance of strategic error, decisions were decided by data-driven metric, focusing effort and project programming on what actions need to occur from trends reported. With this continuous model in place, contingency plans can be established at a month-by-month and year-by-year rate. | Failure to use data-driven decision-making would result in a failure rate not predicted, estimated, or foreseen. Pushing for data-driven decisions and root cause analysis ensured the continuation of the project lifespan. | Medium |
| Ethics risk associated with overall injury and incident reporting. | To mitigate ethics associated with injury and incident trends and reporting, the health and safety team took ownership for establishing work relatedness. In the event of an injury or illness concern, the site EHS manager was responsible for guiding the EHS team. In addition, data were provided by the organizations software system which pulled data trends directly to prevent error from manual entry or prevent any data manipulation. | Having mechanism in place prevents the question of data validity or data integrity. Utilizing an organizational software system where does not manually take data ensures the longevity and validity of the project results. | Low |
| Market risk with reference to a potential economic decline. | To maintain organizational goals of cost savings and responsible purchase plans, speed and accuracy proved value added with overall cost saving analysis ROI presentation. | Market shifts proved limited but a potential risk for the ACME project. Key objectives were to increase the health and well-being of all warehouse worker which led to overall cost savings. | Low |
| Ergonomic solution cost too great for improvement | Ergonomic solutions presented to organizational leadership were objectively evaluated and only presented to operational leadership under two criteria: prevent egregious acts on safety or the ergonomic solution impacted two of three key areas: safety, production, and quality. This was essential during the project proposal process as it ensured a focus on ACME values | Ergonomic engineering is an enhanced measure for removing barriers and potential safety hazards associated with process design. Not allowing or not utilizing ergonomic engineering solutions had a potential for halting or preventing this project from obtaining overall objectives. Ergonomic engineering solutions reduced injuries where education was unsuccessful. | High |

| | | | |
|--|--|--|--|
| | towards responsibility spending decision-making and targeted key areas for warehouse workers safety. | | |
|--|--|--|--|

9.2 Constraints

With building any new program or initiative, change management principles were reviewed to ensure data-driven decision-making, implementation, and continuous adoption. The constraints faced included:

1. Inability to guide 24-hour-a-day, 7-day-a-week operations as a sole contributor; faced lack of support with injury prevention initiatives.
2. Software systems that housed metric data were difficult to navigate which prolonged the projects continuous improvement cycle.
3. Gaining buy-in on projects that could mitigate injury was faced with challenge or denied if not proven or guaranteed as a 3- to 6-month ROI.
4. Scope creep, where the project lost direction briefly in 2017, where focus was not necessarily on injury prevention but team education and training that led to overall continuous adoption of injury prevention programming.
5. The organizational structure around recordability of workplace incidents or injuries dramatically changed in 2017 resulting in a substantial increase of 297% in recordability.

9.3 Assumptions

Key assumptions upon project start that were faced with challenge:

1. Assumed that the organization understood the role and purpose of having project. The project faced challenges with the education of the role and job function, overall purpose, and expertise. Confusion was found among the EHS team, leadership, and warehouse workers of overall purpose.
2. The organization would have metrics and data points readily available as the consultant found that data mining and metric collection were difficult to navigate with the organization divisions having numerous software systems where information was compiled and analyzed.
3. Assumed based on the hiring structure of project and consultant hired as an individual contributor with no immediate direct reports.
4. Site operations placed safety as a top priority.
5. ACME had direct software systems that would guide the project towards overall goals with data mining and data-driven decision-making.
6. Ability to leverage the team of 10 EHS members to implement and maintain injury prevention programming.

10 Financial Plan

The financial plan was not released by ACME for review, but overall ROI was provided. ROI was calculated by combining the overall costs for the project, programming costs, and materials used throughout the implementation process. Costs such as computer, printer ink, paper, pens, and general office supplies were not included in the ROI calculation. The overall ROI formula is provided and expressed as a percentage:

$$\text{ROI} = (\text{Operational Cost Savings} - \text{Cost of Program}) / (\text{Cost of Program})$$

$$\text{ROI} = 821\%$$

The overall budget was maintained and monitored by four levels of approval. In the event the project required the purchase of products or programming, the workflow included

1. Site EHS Manager
2. Regional EHS Manager
3. Finance Director
4. Procurement Specialist

11 Quality Assurance Plan

Establishing a Quality Assurance Plan for this project required a deeper dive into the organizational culture and management of change. To navigate the organizational structure, the principles of Kaizen and the PDCA were utilized when evaluating the success of the overall project.

The scope of this project was to provide the guidance and resources for the reduction of work-related injuries and incidents, tracked and measured by the following:

- Reduce overall injuries by 50% by December 31, 2018. This was measured on a year-by-year and month-by-month basis utilizing the site software systems which tracked the overall case and case statistics. This guided the understanding of when, where, and how injuries occurred to identify and address key trends. Following this step, ACME changed or modified the department-specific incident and injury mitigation plans following a data-driven decision-making platform.
- 2015 data were the baseline data provided and utilized to compare results year over year with the target goal of completion December 31, 2019.
- To maintain integrity, labor hours and production are reviewed on a year-by-year and month-by-month basis to ensure that false reduction was not recorded. For example, if the overall project reported a 50% reduction in injuries but also had a 20% in overall labor hours and 0% change in production, the claim of 50% would not be valid with the focused attention on less hours leading to less overall risk.
- OSHA recordables are state and federal governmental agency requirements for reporting. For an organization not to report accurately and promptly would be a violation set by this government agency. The data provided are delicately reviewed with several layers of approval before submission, which was not controlled by the organization's EHS team.
- The data collected, representing the total number of work-related incidents and injury cases, recordable cases, labor hours, and production rates were controlled by the organization's EHS team. The software system, owned by ACME, is a third-party software system that is designed for the management and evaluation of EHS programming. The data provided for this project were directly provided by the software systems utilized in ACME and did not require any adaptation or modification.

The project scope and project work followed the principles of Kaizen which focused on the theory of slow incremental change over time that yields greater results. This principle is an organizational focus reminding organizational leadership the importance of continuous improvement and the theory of human adaptation to change. This application served as a reminder of how slow incremental change is important when evaluating the year over year success.

In addition to the principles of Kaizen, the theory of project management, PDCA, was utilized for managing the projects continuous improvement cycle. The PDCA cycle

is an organizational preferred process for project management which includes making a plan to include scope and objectives related to a goal. Do refers to the action associated with the plan; how did the execution occur? Check refers to an after-action review and feedback associated with the project, pilot, or programming and using this data to Act, or make improvements. This cycle is continuous in nature and requires continuous feedback for implementation and overall organizational adoption which required consistent monitoring of success and failure rates. The following projects are examples that were entered into the PDCA cycle:

Educational Programming:

- New hire education surrounding injury prevention
 - Plan: Implement control measures to present new hire orientation safety material to all incoming warehouse workers.
 - Do: Performed 1-hour sessions with each new hire focusing on general safety, biomechanics, and health and well-being.
 - Check: Feedback was requested from warehouse workers on helpfulness of information, and new hire injury trends were reviewed on a consistent basis. The organization saw a decrease in overall injuries reported by new hire warehouse workers, which confirmed success of programming.
 - Act: Mechanisms for program adoption were established to ensure the continuation of this program and incorporated into the new hire orientation template.

- New hire trainer education surrounding the importance of injury prevention
 - Plan: To create and deliver an injury prevention training course designed specifically for the organization warehouse worker trainers. This course included key indicators for injury and guidance on personal health and well-being.
 - Do: The programming was delivered in both 2017 and 2018 in the months of July and October.
 - Check: Programming saw an immediate ROI with less than a 4-week ROI. Positive reviews from the warehouse worker trainers were communicated by both the trainers and the operational leadership that supported them.
 - Act: With positive ROIs and positive reviews, the project required organizational leaders to support the continuation of the program which was accepted and owned by the operational training manager.

- Process assistant ergonomics training
 - Plan: To create and deliver an ergonomics training that developed process path leaders to identify ergonomic risk factors and areas of opportunity for continuous improvement plans.

- Do: Delivery of the program occurred in partnership with organization leadership development program and covered process path leadership on all four shifts.
 - Check: Direct feedback was collected from the process path leadership, with positive implications. Continuous improvement plans were identified to be focused surrounding ergonomic improvement plans by both operational leadership and process path leadership.
 - Act: No modification of the training occurred. Support was communicated to site leadership to express support and adoption.
- Leadership continuous improvement through ergonomics training

Operational Support:

- Process and job function physical demands and risk assessments
 - Plan: Identified each job function and categorized by department.
 - Do: Conducted each process path physical demands and risk evaluation.
 - Check: Compared time spent with evaluation to overall timeline and projected completion date. As important as this project was to complete on time, the project required a great deal of concentration and evaluation to ensure consistency throughout each job process path.
 - Act: Communicated to the site EHS manager and adviser on status of project and any barriers that were faced and provided estimated timelines for completion.
- Engineering and ergonomic engineering change management
 - Plan: Partner with operational leadership on all change management requests to provide safety and ergonomic engineering recommendations and evaluation.
 - Do: Partnered with senior leadership to develop plan for operational leadership buy-in and communication. Once projects were identified, the consultant would provide the project manager detailed risk and process engineering recommendations for operational adoption.
 - Check: Consistently was faced with new projects without a formal evaluation request.
 - Act: After discussing with the operational senior leadership, reset occurred with building and project managers to ensure compliance with project evaluation.

In addition to metric tracking provided by the ACME software system, each year the consultant and site adviser met to discuss the strategic plan for continuously driving the key principles of injury prevention; focusing energy towards data-driven results.

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