

Case Study: The Implementation of Tool Box Talks at a Steel Subcontracting Shop

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The purpose of this study is to evaluate the effectiveness of implementing tool box talks at a small iron working shop. A case study of workers at Ironstone Metal Works, Inc. based out of San Carlos were given a series of tool box talks then evaluated on the effectiveness of the implementation of regular safety meetings. The impact focused on this paper will be the effectiveness of the implementation of regular safety training and how it relates to a safer work environment, reduced cost of workplace injuries, and workers knowledge of safe practices. An analysis of worker interviews and survey responses will be used to determine the effectiveness of using tool box talks.

Key words: small to midsize, subcontractor, safety training, tool box talk, case study, ironworker

Introduction:

Occupational Safety and Hazard Administration (OSHA) labels the construction industry as one of the most dangerous occupations due to the high rate of injury and death that occur yearly, which in 2016 claimed the lives of 5,190 individuals (United 2018). Safety in the construction industry is of the utmost importance because everyone deserves to go home at night unharmed. OSHA commits to this ideal by providing guidelines on what should be done for worker safety as well as inspecting job sites to assure appropriate safety techniques are being implemented in order to reduce worker injury and fatality. Safety is something companies must invest in through trainings, ensuring that workers use appropriate personal protective equipment (PPE), as well as maintaining a standard of safety. This payment may come in many forms in that it could be a dollar value associated to an injured worker, or simply taking time to discuss appropriate safety techniques when involved in certain construction related activities. These periods of discussion are formally known as tool box talks which have the potential of saving someone from being injured or killed, as well as to protect the business from potential lawsuits of injury (Group 2018). Through frequent tool box talks companies are able to educate themselves and their workers on appropriate safety precautions in the field as well as mitigating the company's liabilities. Tool box talks are often 10-minute meetings with employees discussing proper safety techniques revolving around all different facets of construction.

These topics were chosen with the intent of informing the workers of systems they work with every day. Dust awareness was chosen because there are ample amounts of particulate in the air when working with steel due to grinding, sanding, and cutting steel. Cranes, rigging and hoisting was chosen because a major part of their job is to work with operators to safely fly their product onto structures therefore knowing safe practice is crucial. Proper lifting technique was implemented because everything the workers deal with is very heavy therefore understanding proper technique for lifting large heavy items is crucial for their safety. PPE was implemented to reinforce the idea of wearing respirators as well as ear plugs, facemasks and hardhats when appropriate. Lastly, forklift operation was one of the most crucial because the workers deal with the forklift everyday and it could be a very dangerous piece of equipment that if the operator is unaware of safe practice, people will be hurt. Due to the dangerous nature of ironworking the number of deaths, on average, is six times higher than that of any other trade (Elcosh 2018).

This paper includes the results of the implementation of tool box talks Ironstone Metal Works, Inc., who had no prior experience with this type of safety program. The information provided can provide a baseline guide of how to implement these systems for small to mid-sized contractors looking to improve safety practices. Ironstone is a small steel subcontractor with seven employees six of which are field/shop workers that are faced with dangerous situations on a daily basis. They currently have little to no implemented safety management practices. The company under investigation participates mainly in the custom home market of the Silicon Valley area where they complete work in the areas of structural steel, ornamental gates and railings, and one off ornamental iron structures. Due to the

nature of this business many accidents occur where people may be seriously injured or killed therefore the implementation of tool box talks was a necessity. Through first hand implementation and observation, this report will provide a conclusion as to how workers perceive and utilize the information given to them in tool box talks.

The most deadly aspects of ironworking as described by ironworkers.org is; the exposure to toxic welding and paint fumes, striking hazards during material handling, rigging failure, exposure to airborne metals/dust, and lack of personal protective equipment. All of these accounts were taken into consideration when determining the nature of tool box talks in order to provide workers with a wide variety of safety techniques, as well as to mitigate company liability in many different areas. Due to the dangerous nature of iron working, safety talks are crucial for maintaining a safe working environment and will be introduced on a regular basis at Ironstone Metal Works Inc.

Methodology:

Throughout a ten week span at Ironstone Metal Works, Inc. a series of five tool box talks were conducted over a five week period with the five weeks being used to assess and evaluate worker safety. Throughout the ten week period observations of employee safety practices were monitored to determine if tool box talks actually made workers more knowledgeable, safer, and if it mitigated near misses. Although there are countless topics that may have been covered in these meetings, the most relevant to worker safety were assessed and determined to be dust awareness, cranes rigging and hoisting, proper lifting-backs, personal protective equipment (PPE), and forklift safety (Zero 2018). Based off the nature of ironworking, these topics were chosen to educate the workers on potential hazards that they come into contact with every day.

During the first five Fridays at approximately 7am, a tool box talk was conducted. The talk consisted of handing all workers a copy of the tool box talk for the respective day where the workers were lead through the information on the tool box talk. After completing the initial talk workers were able to ask questions of what they learned. Once all information was clear, the present workers would sign a sheet saying they were present for the discussion.

After all the talks were given, the task was, then, to observe whether the workers implemented the various safety techniques presented or if they chose to ignore them. This took place through a series of observation and conversation during the weeks following the tool box talks. At the end of the ten week program, the workers were assembled where they were asked a series of questions to determine the effectiveness of the tool box talks. Questions were administered in the form of both a written survey and oral meeting. The written survey consisted of yes or no questions with a section for workers to write any additional comments they may have. During the oral meeting workers were encouraged to give their opinion on the effectiveness of the talks, what they disliked, and what they liked.

Results/ Discussion:

After 5 weeks of tool box talks and 5 weeks of observing safety practices in the field, it was evident, through simple observation, that the tool box talks made a significant improvement in safe practices on construction sites. After tool box talks were given, the workers began wearing appropriate P.P.E. such as dust masks, face shields, gloves, welding hoods, and long sleeve shirts. Workers became much more aware of the threat of dust and how it can affect their bodies, causing most of the workers to start wearing respirators. While conducting the crane and rigging tool box talk we inspected all necessary rigging items to ensure worker safety, while throwing away slings and chains that were unsafe for workers to use. Through this the workers were able to determine what systems are appropriate for use and when they need to be thrown away. After the forklift safety tool box talk, the workers seemed much more careful in their use of the forklift and proceeded to use the machine in an appropriate but safe manor. For example, things such as wearing a seatbelt, being fully aware of surroundings, and when parked making sure the forks are flush on the ground. The only system implemented that was not evident on site was appropriate lifting techniques. Overall, after introducing tool box talk management saw a much safer working environment as well as more precautions taken by the workers to protect themselves.

During the oral meeting workers expressed that they found these talks to be extremely helpful and expressed interest in continuing this program. The workers felt as though they were adequately prepared to handle unsafe conditions within the parameters of tool box talks given. In other words, the workers felt as though they had the correct tools to make the safest possible decisions as they pertain to dust awareness, cranes rigging and hoisting, PPE, proper lifting technique and fork lift safety. Workers expressed great enthusiasm during the talks on dust awareness, cranes rigging and hoisting, as well as forklift safety, but felt as though personal protection equipment and proper lifting technique were two categories that were not completely necessary. The workers expressed that they learned new, helpful, information as it pertains to dust awareness, cranes rigging and hoisting as well as forklift safety. Management noted that after the introduction of the dust awareness talk workers began wearing respirators full time in order to mitigate dust inhalation. In terms of rigging, the workers and management were informed on safe practices as it pertains to slings, where once current slings in use were inspected three were thrown away due to cuts and threads showing within. Had these talks not been given, management stated that these slings would have still been in use. Workers were also very alert during the forklift safety meeting because they learned new safe practice techniques that will with a forklift, such as simply setting the forks flush on the ground when parked.

Although the workers were attentive during the talks, they felt as though the proper lifting technique, and PPE toolbox talks were unnecessary and a waste of time. In terms of proper lifting techniques the workers ensured that it was not a topic that needed to be covered since they were used to lifting very heavy objects they had their own techniques they have been using for years. Due to this longevity they have had within this particular career they insured that they knew how to lift heavy objects without hurting themselves. In terms of personal protective equipment, the workers noted that most equipment does not apply on the residential level in that they are not required to wear hard hats or glasses on their job sites. The workers understood the precautions they were foregoing through not wearing P.P.E., however they thought it was a waste of time - management would disagree because once these talks were given the use of face masks, respirators, and hearing protection became much more prevalent with the workers.

Although there are many systems management can install to mitigate safety risks, tool box talks are a simple yet effective method to educate workers to be safe on site. Through the endeavours of implementing tools box talks at a company with little to no prior safety management system, management learned that workers enjoyed being taught how to keep themselves safe by making them aware of situations around them as well as that the workers were unaware of unsafe practices in the first place. Worker and management satisfaction, with these systems, were much higher than anticipated in that the reactions post meetings were extremely positive from worker attitude to the actual implementation of systems discussed.

After reviewing five topics with the seven employees at Ironstone Metal Works, Inc., the workers had never been properly trained or informed of appropriate safety practices in the fields of dust awareness, cranes rigging and hoisting, proper lifting-backs, personal protective equipment (PPE), and forklift safety. Workers began to wear appropriate ppe, the discarding of inadequate slings/chains, and the correct methods of parking a forklift were followed. Though the workers were aware of these systems and how they related to their job, this was the first time they had been taught proper safety management techniques of this nature.

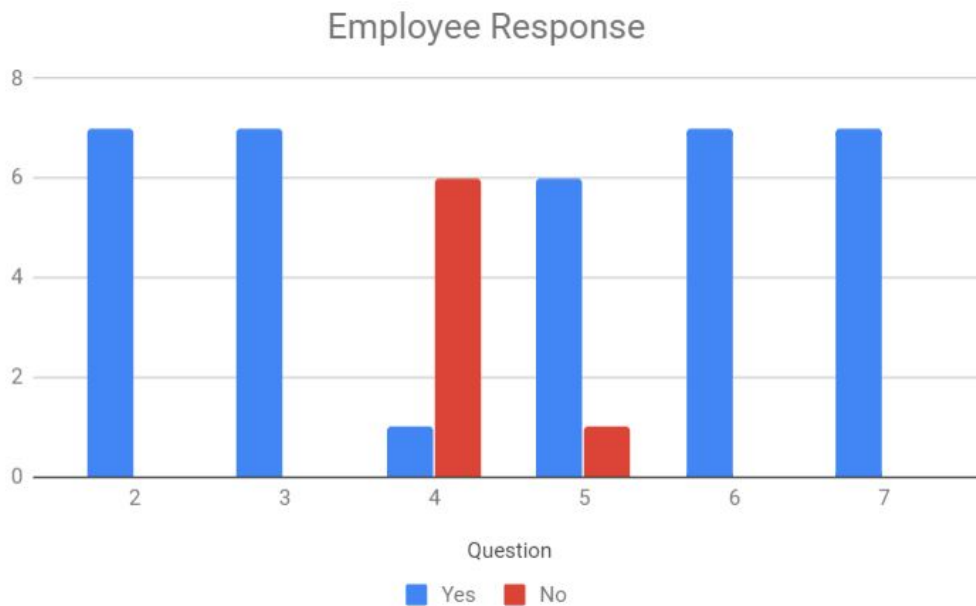
Survey Results/ Discussion:

The results of this project were determined through the administration of a short survey as well as an oral meeting. The seven employees who were surveyed were all present while the tool box talks were given. The questions given during the written survey were yes or no questions that embodied the purpose of giving tool box talks. The questions were tailored to gain a better understanding if this made the workers feel safer.

The workers responded in a similar fashion except for questions four and five. Question four asked if the talks were a waste of time and money, which one worker responded that they were in fact a waste. This information could be found in the oral meeting where some workers expressed that two of the talks were unnecessary. Question five asked if they enjoyed learning about safe practices where one person responded that they did not. Questions one thru three

asked if the tasks were helpful and whether or not the employees learn new techniques to practice safe construction. Questions six thru seven asked if they wanted to see talks implemented on a regular basis and whether or not it made workers more aware of unsafe situations. All workers responded in a similar fashion in that they agreed thta the systems were helpful for all of these items as well as wanting to see it implemented regularly. Majority of the workers felt as though the tool box talks were a beneficial program to have instituted but felt as though they did not need to occur so often.

A concern expressed in the written portion of the questionnaire was that if these were to continue the workers would want to see new information presented and not to have repetitive tool box talks because that is when it becomes a waste of time. The workers thoroughly enjoyed tool box talks and wanted to see them continue into the future because they felt as though it allowed them to become educated on what safe practice is and how to maintain it in one of the most dangerous lines of work.



Conclusion:

The purpose of this case study was to determine the adequacy of tool box talks and whether or not they truly made the workers more safe when faced with dangerous situations. Through a written survey and oral meeting, workers expressed that they felt as though these safety meetings kept them safer and gave them the correct tools to combat unsafe working conditions. As an observer of practices at the shop and in the field, I noticed the workers become more vigilant to safety in everyday situations. Workers began wearing appropriate ppe, rigging in a safer manor, proper use of forklifts, and all around better practice. By taking a small amount of time every ten days a company can greatly reduce its liability as well as educate workers on safe practice techniques to give them the proper tools to combat unsafe situations.

The implementation of regular safety training correlated to a much safer work environment and an increase of worker knowledge of safe practice. A more extended time period, as well as further documentation, is required to determine the reduced cost of workplace injuries. Due to the lack of time and inadequate documentation of workplace injuries further investigation is needed to determine if tool box talks correlate to a reduced cost of workplace injuries. Through a series of oral meetings, written surveys and first hand observation it was determined that tool box talks provided a safer working environment as well as increased worker knowledge of safe practices as they relate to construction.

Currently, management is working on developing a systems where Tool Box Talks will be conducted every 10 days covering a variety of topics. Due to the research conducted management came to the conclusion that these talks were in fact useful and should be implemented on a consistent basis. Management came to this conclusion because the tool box talks both increase worker safety as well as decreased liability on management. While conversing with the owner of the business he mentioned how he greatly appreciated the introduction of these safety management techniques and reassured that this program will continue to be implemented.

Future Research and Closing Comments:

Safety is the most important aspect of construction and should always be further researched to keep workers safe and healthy. Future research done on this topic could be the opportunity cost of having meetings like this. In other words, is the employer losing money on safety talks or saving money in the long run due to the mitigation of liability. A topic that would have been best suited for ironworkers is falls because that is the leading cause of death among the ironworking community. If this project were to be replicated, the inclusion of fall safety should be included in the list of tool box talks. During future implementation of safety meetings at Ironstone this will be a topic that will be widely discussed. A statement of usefulness for employers looking to implement similar systems would be to not waste the workers time, but instead provide information that they do not know already. Workers want to learn new techniques to help them be safer so when formulating these talks provide them with information that will be useful in the future, instead of practices they may already know.

Future research may also include a safety program that monitors the tool box talks and the effectiveness of the material provided. This may include the tracking and monitoring of various topics covered and how to continue to produce relevant information to keep workers safe. In order to track the effectiveness this program management should track near misses and all injuries throughout the life of the company to determine how effective tool box talks truly are.

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Appendix:



Toolbox talk questionnaire:

1. Did you find the tool box talks helpful?

1

2

3

4

5

Not helpful

Neutral

Very Helpful

2. Did you learn something that you did not know prior to our meeting?

a. Yes

b. No

3. Did these talks help you make better decisions when faced with unsafe practices?

a. Yes

b. No

4. Do you think these talks were a waste of company time and money?

a. Yes

b. No

5. Did you enjoy learning about safe practices in construction?

a. Yes

b. No

6. Would you like to see these talks implemented on a regular basis?

a. Yes

b. No

7. Do you feel that you are aware and can recognize unsafe situations more than before?

a. Yes

b. No

Additional comments:

TOOLBOX TALK: CRANES, RIGGING, AND HOISTING

What is the issue?

- Improper use of equipment, and lack of hoisting knowledge cause people to get hurt

Before Operating

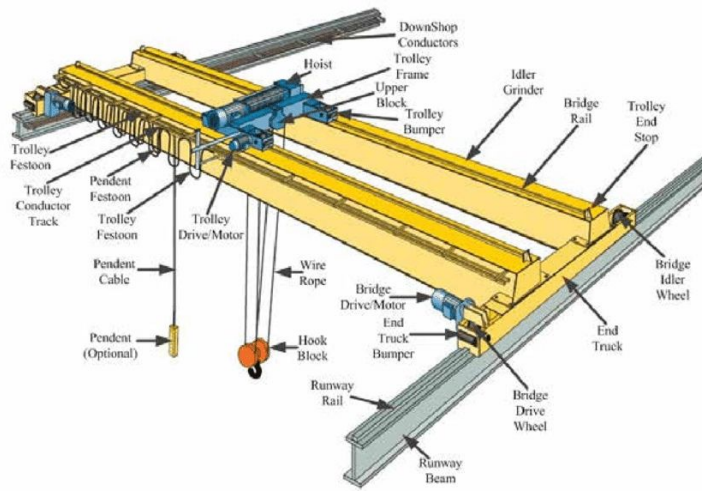
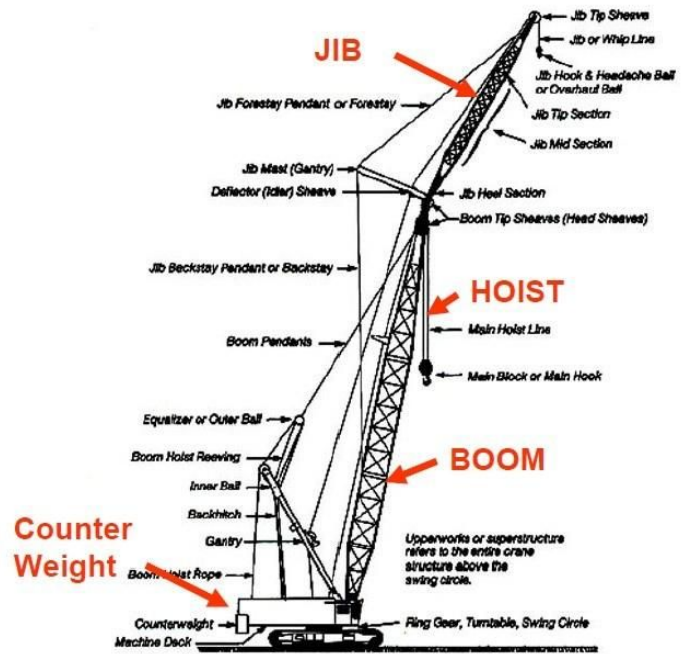
- Inspect, test, and maintain crane through checking fuel, oil, hydraulic fluid levels, wire rope, and all other crucial systems of cranes.
- Discuss mode of communication with crane operator such as radio communication or the proper hand signals that the operator prefers.
- Discuss picks and determine safe location for lifting and rigging materials.
- Ensure outriggers are properly set on a sturdy base with added leveling blocks if necessary.









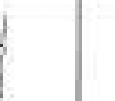











While Rigging

- Inspect all slings, ropes, chains, shackles or anything that may be used to hoist material.
- Determine materials center of gravity and what method will be used to pick the item, i.e. choker, basket, or spreader bar systems and which will be needed.
- Secure a tag line to materials that will be hoisted to ensure that the material will not be able to move in ways that are not wanted.
- Always use extreme caution while rigging for people on and around the jobsite as well as jobsite conditions such as rain or high winds which could cause material to fall.

Do's and Don'ts

- Do wear appropriate PPE especially while loads are suspended, wearing hard hats, safety glasses, gloves, and appropriate fall protection when on elevated platforms.
- Don't walk underneath suspended loads, or ride the load.
- Always use American made products that are able to withstand load being placed on them.
- Always maintain clear, concise and direct communication with crane operator
- Be smart, safe and observant of surroundings while rigging



 Main Hoist	 Auxiliary Hoist	 Hoist Load	 Hoist Load Slowly	 Stop
 Raise Boom	 Raise Boom & Lower Load	 Lower Load	 Lower Load Slowly	 Emergency Stop
 Lower Boom	 Lower Boom & Raise Load	 Swing Boom	 Swing Boom Slowly	 Travel (mobile eqpt)
 Retract Boom 2 hands	 Retract Boom 1 hand	 Extend Boom 2 hands	 Extend Boom 1 hand	 Dog Everything

TOOLBOX TALK: DUST AWARENESS



What is the issue?

- Dust is an unseen killer which may cause serious disease

Causes of Dust?

- Almost all construction activities create dust especially when using materials like: steel, wood, stone, concrete, filler and plaster board.
- While working with steel items such as grinding, sanding, sweeping, core drilling, and sweeping are the main causes of dust inhalation.

Health Concerns?

- Dust can cause irritation of the skin, eyes, and throat but the main concern is when it enters the lungs.
- Dust can cause serious diseases like cancer in your lungs, abdomen, and nose which may potentially lead to Chronic Obstructive Pulmonary disease which is one of the leading causes of death in the modern world.
- Dust can cause asthma and allergic reactions from prolonged exposure.
- Many dust related illnesses do not take effect immediately but dust is always causing harm even if you cannot feel it.

Prevention Plan?

- Wear appropriate PPE, when working around dust causing actions, which consists of dust mask/respirator and safety glasses.
- One way to reduce dust creation is to use a vacuum tool whenever making cuts or performing dust creating activities.
- Never sweep dry dust, always wet down the dust with something like clean sweep to prevent air born dust particulars.

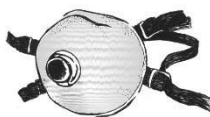
Dust Prevention Equipment?

- There are two main types of protective gear for safe guarding dust, they are masks and respirators.
- Masks are the most common type because they are disposable cloth masks that covers your nose and mouth to prevent dust inhalation.

- The other type of respirators feature systems that clean air and occasionally use pressurized air.
- Respirators cannot be use effectively by all people due to things like asthma, glasses, facial hair, and more.

When should I wear a respirator?

- Respirators should be worn anytime when using angle grinders, Sanders, oxy-acetylene torch, all types of welding, sand blasting, and sweeping.
- It is recommended to wear a respirator majority of the time in order to prevent inhalation of poisonous gases from welding systems, as well as to prevent all types of dust inhalation.



Half Mask,
Particulate



Half Mask,
Dual Cartridge
Disposable



Half Mask,
Dual Cartridge
Reusable



Self Contained Breathing Apparatus (SCBA)



Full-Face
Dual Cartridge
Reusable



Canister Type
Gas Mask



Powered air Purifying
Respirator (PAPR)



Continuous Flow Supplied Air Respirator



TOOLBOX TALK: FORKLIFT SAFETY

What is the purpose of this talk?

- Provide a summary of basic safety procedures and safeguards associated with the operation and handling of a forklift.

What is a forklift?

- A forklift is a vehicle with a pronged device in front for lifting or carrying heavy loads.
- Fork lifts may run off of propane, diesel or gas so be sure to fill forklift with appropriate fuel.

Why is it Important?

- Roughly 85 deaths and 34,900 injuries occurred last year from misuse of forklifts.
- Forklifts allow workers to pick and carry heavy loads with ease.
- Understanding when forklifts are being misused will prevent injuries and keep workers safe.

Safe Operation of Forklifts

- When operating always wear a seatbelt in case of tip overs.
- When forklift is parked, the forks must be flat on the ground to mitigate tripping hazards.
- Unattended forklifts (operator is more than 25 feet away from vessel) should be parked with motor off and e-break on.
- While operating on an incline the load should be on the uphill side of the incline.
- When traveling with no load the forks should be approximately 6 inches off the ground.
- Never allow anyone to walk underneath a suspended load.
- Ensure forklift has ample capacity to pick load.
- Be aware of overhead obstacles while forks are raised.
- Always be aware of nearby pedestrians and drive carefully.

10 August 2018

IRONSTONE METALWORKS, INC.



REMEMBER TAIL SWING
LOOK OUT!
WATCH FOR PEDESTRIANS
DON'T BE BLIND
NO RIDERS
DRIVE CAREFULLY

DRIVE CAREFULLY
Always wear your seat belt

OVERTON
Safety Training, Inc.

A collection of safety posters for forklift operation. The posters are arranged in a grid and feature various safety messages and illustrations. The central poster is the largest and features the text "DRIVE CAREFULLY" and "Always wear your seat belt". It also includes an illustration of a forklift and a worker. The other posters are smaller and feature various safety messages and illustrations.

TOOLBOX TALK: PERSONAL PROTECTIVE EQUIPMENT (PPE)



What is the issue?

- Individuals being injured due to improper PPE being worn.

What is PPE?

- PPE is equipment worn to minimize exposure to hazards that cause serious workplace injuries and illness.
- PPE prevents the exposure to chemical, radiological, physical, electrical, mechanical, or other potential workplace hazards.
- PPE may include items such as gloves, safety glasses, safety shoes, ear plugs, hard hats, respirators, coveralls, vests, full body suits, fall protection, and much more.

Why is it Important?

- Workers can be injured at any point on a jobsite or in the shop therefore must wear appropriate personal protective equipment while working.
- Safety is our number one priority
- Personal protective equipment could save your life if used properly.

Personal Fall Protection Equipment

- When workers are exposed to fall hazards at elevations of more than five feet, or over water, are required to wear fall protection
- Prevent a worker from falling (Positioning devices)
- Arrest the fall of workers without causing injuries
- Retrieval, otherwise known as the rescue plan, covers post fall scenarios
- Suspension systems are able to lower and support the worker providing for a hands free work environment.
- Items potentially required: Harness, horizontal lifeline system, lanyards, and anchors.

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EYE & FACE PROTECTION
 Safety Goggles, Safety Glasses, Prescription Eyewear, Face Shields, Accessories

HEARING PROTECTION
 Single Ear Earplugs, Multiple Ear Earplugs, Earbuds, Earmuffs, Earplugs, Earplugs

RESPIRATORY PROTECTION
 M10 Disposable Mask, Half Face Respirator, Full Face Respirator, Self Contained Breathing Apparatus, Powered Air Purifying Respirator

Our Partners
 Lakeland, Honeywell, 3M, MSA, Ansell, Duffryn, Allpart, Livox, Scotty, Pegasus, etc.



TOOLBOX TALK: PROPER LIFTING - BACKS

What is the issue?

- Improper form while lifting heavy objects causing harm to ones body

What are we doing wrong?

- Not designating enough people to lift a heavy object, or having too many people trying to maneuver a single object
- Causing a sudden shift in weight, putting too much strain on a single part of the body, usually ones back
- Not using a back brace when necessary, however back braces should be used sparingly as they cause core strength to diminish

Why is it Important?

- Workers can be injured at any point even while lifting somewhat light objects if proper form is not used.
- Safety is our number one priority.
- In 2001, the Bureau of Labor Statistics reported that over 36 percent of injuries involving missed work days included should and back industry.
- Overextension and cumulative trauma are the largest factors in work place injuries.

How to Properly Lift Objects

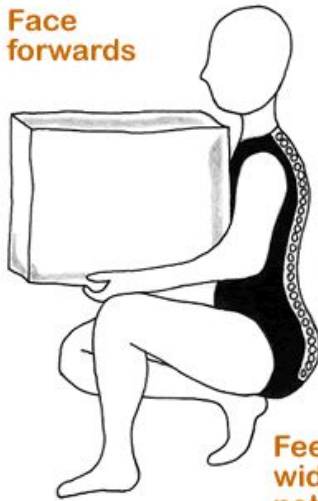
- Participate in a stretch and flex in the morning to prepare muscles for heavy lifting.
- Know the weight of the object you are lifting, ask for help when necessary.
- Center your body with the object to distribute the weight evenly.
- Do not hinge at the hips, bend at the knees.
- Keep the object close to your body while hoisting up
- Use your leg muscles to life the object, not your back.

LIFTING DO'S & DON'TS

<p>DO LIFT AS A TEAM</p>  <p>Do lift bulky or heavy loads as a team. Doing so is smart and the safe way to work.</p>	<p>DO TURN WITH LEGS</p>  <p>Do move your legs and feet when turning or lowering the load. Avoid twisting at your waist.</p>	<p>DO USE YOUR LEGS</p> <p>Do lift the load using your powerful leg and buttocks muscles. Your feet should be wide apart, head and back upright. Keep abdominal muscles tight and the load in close.</p> 	<p>DO USE EQUIPMENT</p> <p>Do use equipment like hand trucks, dollies, or forklifts to do the heavy lifting. It's much less work and less risk of injury.</p> 
<p>DON'T LIFT BULKY LOADS ALONE</p>  <p>Don't lift bulky or heavy loads alone. Doing so puts great stress on your low back muscles and spine.</p>	<p>DON'T TWIST WHEN LIFTING</p>  <p>Don't twist when lifting, lowering, or carrying any load as this increases your risk of back injury.</p>	<p>DON'T USE YOUR BACK</p> <p>Don't lift the load with your rear end high and your load low. Use your leg muscles, not your weaker low back muscles.</p> 	<p>DON'T LIFT HEAVY LOADS</p>  <p>Don't lift heavy loads when you can use equipment. It is less work and less stress on your low back.</p>

Face forwards

Good Grip



Neutral Spine

Feet hip width and not parallel

