



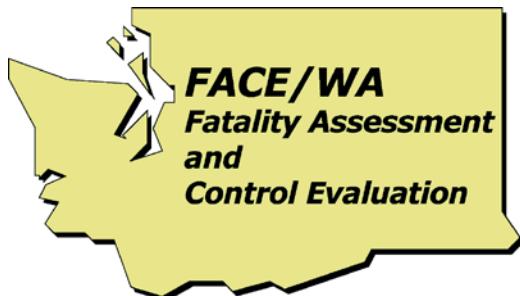
Washington State Department of
Labor & Industries



FATALITY INVESTIGATION REPORT



Investigation: # 03WA03901
Release Date: October 5, 2009
SHARP Report: # 52-19-2009



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A 16-Year-Old Worker Dies When Struck by a Portable Gantry Crane used as an Engine Hoist in Washington State

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SUMMARY

In August of 2003, a 16-year-old male employee died when he was struck by a portable gantry crane used as an engine hoist while working at a wrecking yard / auto parts company in western Washington State.

On the incident day, a wrecking yard customer was using a manually operated portable gantry crane, built by a local metal fabrication shop, to remove an engine and transmission from a salvaged vehicle. A gantry crane is a type of crane which lifts objects by a hoist. This gantry crane had four automobile wheels with pneumatic tires installed on the bottom of the horizontal supports allowing the whole crane to traverse.

The customer was having difficulty moving the loaded crane and was aided by the victim. As the customer and the victim were manually moving the gantry crane, it began to roll freely. The crane rolled into a shallow depression, became unbalanced and fell, striking the victim in the head as it toppled over.

Witnesses called 911 within moments of the incident. Salvage yard persons attended to the victim until emergency help arrived, but the victim died at the scene.

GUIDELINES

To prevent similar occurrences in the future, the Washington State Fatality Assessment & Control Evaluation (FACE) investigative team concluded that any business engaged in salvage / wrecking yard or similar operations should follow these guidelines:

Employers must select and make available the most appropriate crane or lift equipment manufactured and certified for the job.

- All crane operation / lift equipment must be used according to manufacturer's guidelines. If manufacturer's guidelines are not available, use established best practice for all crane lift equipment used.
- All employers and crane operators need to clearly understand and control site conditions and limitations for all crane lifts and crane travel at the site.
- A portable or mobile crane must only be used on a surface that can safely support its lift capacity and travel capability.
- Employers must conduct training for all crane operators, users and support personnel to ensure that all workers understand the hazards associated with portable and mobile cranes and crane lifts.
- Employers need to diligently supervise and coach young workers beyond the level provided for experienced adult workers in order to help young workers recognize and avoid the hazards of performing tasks at the organization's site.

INTRODUCTION

In August of 2003, the Washington State FACE Program was notified by the Division of Occupational Safety and Health (DOSH) of the death of a 16-year-old worker.

The Washington FACE Field Investigator met with the regional DOSH representative who investigated the case. The DOSH case files were reviewed and a synopsis of the incident details, the description of the work site, and the position of the people and equipment involved in this incident were discussed.

INVESTIGATION

In August 2003, a 16-year-old victim was working as a part-time employee at an auto salvage wrecking yard / used auto parts facility in western Washington State.

The weather was clear, dry and warm and was not considered a factor in the incident.

On the date of the incident, the victim started work close to his usual time, somewhere around 10:00 AM. The victim's scheduled work hours were from 10:00 AM to 3:00 PM, six days a week, during the facility's summer business schedule.

At approximately 2:00 PM a customer was removing an engine and transmission from a salvaged car. He had positioned the portable gantry crane over the vehicle to extract the engine / drive train from the car. The customer was experiencing difficulty using the crane to pull the awkward and heavy engine block / transmission up and out of the vehicle. The engine and transmission became hung up on the car and it was difficult to move the crane in the rocks and gravel surface of the yard.

The victim was working nearby and noticed that the customer was having difficulty. The victim approached the customer, who he apparently knew, and offered his help. (*It was noted by the employer that this was contrary to*

(their salvage yard policy to assist the customer with parts extraction while working in the yard.)

With the victim's help, they began to push the crane. After the crane was moving, the victim began walking away with his back to the crane to return to his previous task. The loaded crane carrying the engine and transmission (estimated to be 1,000 pounds, see photos 2-3) began to move quickly down, and then up a narrow drainage channel. This caused the load and center of gravity of the crane to shift, and it began to topple over. The customer yelled a warning but one of the gantry crane steel support arms struck the victim in the head before he could react and get clear of the crane.

THE BUSINESS

The business is family owned and operated and started approximately 50 years ago. The company currently has three separate salvage / wrecking yards / auto parts locations in the state. As a wrecking yard / auto salvage yard, the business sells automotive parts that are taken from wrecked or non-operational vehicles.

Wrecking yards or auto salvage yards are called auto recyclers, as they play an important role in "re-selling" functional components from non-functional automobiles. Components of the automobile are either recycled or disposed of. It is estimated that as much as 70% to 80% of an average vehicle can be salvaged.

The business involved in this incident has evolved from an "employer parts retrieval", where the employer is involved in the removal of the vehicle parts, to a total "customer self-service parts retrieval" operation, where the customer is responsible for extracting / removing parts. The self-service business model process was one the salvage yard had researched and eventually implemented for their organization. The company had about 65 employees in the three locations that the organization owned and managed.

The employer had received a minor work endorsement to employ workers less than 18 years of age in Washington State.

COMPANY SAFETY

The employer has a written safety and accident prevention program in place. However, they did not have a full-time safety professional to deal with safety and health oversight for the three salvage yards. The employee responsible for safety was the operations support manager for the company. In addition, each site manager had the responsibility of day to day safety for their location.

The safety program was included as part of the "Employee Handbook". The employer also had a computer-based safety training program. This training was required and documented for all employees. Each training module has a questionnaire (safety quiz) associated with the specific training module. Employees are required to successfully answer the questionnaire in order to receive credit for completing the training module. Safety training for new employees also included a "New Employee Checklist" that was reviewed by the site manager with each new employee.

The operations support manager and site managers meet monthly to review safety issues, accident reports, and injuries.

The safety meetings develop possible solutions and prevention measures to be implemented by the company. Safety items from the meeting may include housekeeping, facility or equipment repairs or training issues.

The employer did not have any specific process, procedure, or guidelines for the use of the gantry crane involved in this incident. They also did not provide any training or instruction on the proper use of the gantry crane for either the customer or the salvage yard employees. The employer did have written guidelines for other equipment used by its employees in the salvage yard.

The company policy prohibiting employees from assisting customers was instituted as an employee safety measure and to keep employees focused on assigned tasks. This policy was verbally explained to the victim and all other employees.

THE CRANE

The salvage yard provided the manually moved portable gantry crane that customers could use to lift and handle large automobile components. A portable gantry crane is essentially a wheel mounted free standing, self supporting crane used for lifting heavy objects.

The portable gantry crane was not engineered or purchased from a manufacturer. The salvage yard owners had the crane constructed by a local area metal fabrication shop using a basic portable gantry design that the owners had copied from existing cranes of its type.

The crane itself was 12 feet high by 6 feet wide. (see photos 2-6) It was built using five-inch by five-inch box steel, and was made to be used on rough terrain. The crane frame sat on four old car wheels to help navigate the rough terrain that the crane would face while being moved within the yard. It was non-motorized. The rubber tired wheels were attached to "U" channel steel. All four wheels were mounted as casters, allowing them to swivel and rotate in a 360 degree motion. The tires were intended to help the crane move freely on solid surfaces and maneuver on the gravel surface of the salvage yard. There were no locking mechanisms on the individual wheels to lock them in place and no braking system to prevent movement of the portable crane. The salvage yard owner had refurbished this particular crane shortly prior to the incident, and the certified welder who worked on the upgrade of the system had indicated in interviews that the crane capacity was greater than one ton. The employer did not conduct capacity testing of this portable gantry crane.

THE VICTIM

At the time of the incident, the victim was working as part of a two-person team at the salvage yard. The victim was assigned to assist the salvage yard forklift operator in moving the vehicle inventory and collecting parts and pieces of the salvaged cars not picked up by the forklift.

Other responsibilities included:

- Row Cleanup - Row cleanup duties required the worker to pick up all parts and debris within each row from vehicles that are going to be scrapped.
- Engine Removal – The worker was to assist the salvage yard forklift operator to remove engines from the yard rows.
- Oil Spots / Spray Clean Up– The worker was responsible to remove oil spills and clean the area after loose, oily dirt had been removed.
- Tire Removal – The worker was to help the site forklift operator with tire removal from yard vehicles.
- Fence Lines Check– The worker was assigned to check the property fence line for parts, any physical breaks or cuts in the fence line, and general yard debris.

The victim had worked for the employer for almost two months. The FACE investigation was not able to determine if the victim had any other experience and / or knowledge of the hazards of working in a salvage yard or work related to gantry cranes prior to working at the salvage yard.

The victim involved in the incident was integrated as part of a youth counseling program that helped facilitate his employment with the wrecking yard organization.

The employer had document evidence of the company provided training that the victim had participated in to include the new employee checklist process.

CAUSE OF DEATH

The medical examiner listed the cause of death as multiple cerebral lacerations and fractures of the skull due to, or as a consequence of, blunt impact to the head.

RECOMMENDATIONS

Recommendation #1

Employers must select and make available the most appropriate crane or lift equipment manufactured and certified for the job.

Before choosing or buying any type of crane or lift equipment, the employer needs to determine the right equipment for the job. The equipment used in this incident was untested and not appropriate for the salvage yard's requirements. This portable gantry crane had no means of locking the wheels in place and no braking system for stopping or controlling the speed when moving. The portable crane also had no means of securing suspended loads in place to keep them from swinging.

The employer should conduct an assessment to help determine what types of equipment they need. The assessment should be as specific as possible and incorporate the details of the tasks and overall productivity. The lift capacities and operational proficiencies also need to be taken in consideration when choosing the equipment

A crane or lift system needs to be selected for the use-specific application. A universal system may work, but more often several types of lift equipment will be needed for a safe, efficient, and effective operation.

An array of cranes and lifting devices are available to match just about every material lifting application needed. The flexibility to choose from a variety of multi-purpose cranes or lifting equipment can also be very valuable to the company, especially a company with employee and customer operators.

Operator training and experience also have to be part of the selection choice equation. Basic skills are different for each operator. This is especially important considering that the skill level of a customer is unknown to a site owner.

Considerations should also include:

- The shape of the parts or equipment it will be used to lift.
- The weight of the material that the equipment will need to handle versus its lifting capacity under various conditions of use.
- The working load variations.
- How and where the load will be moved.
- How the equipment will affect the safety of the operator and support persons.
- How often will the equipment be used
- What training and expertise is required to operate and support the equipment

This particular salvage yard needed to evaluate types of equipment used in the operation by their own employees and their customers in their yard. The portable gantry crane involved in this incident was for customer use only. Furthermore, this was not an all-terrain type of crane and travel under load with was not acceptable practice. The roughness and slope conditions of the terrain over which it was being operated significantly impacted the stability of the equipment and load.

FACE recommends that the employer enlist the help of a consultant with an engineering background in crane and lift device equipment and lift application to help the employer review the site and provide recommendations regarding types of equipment and operational criteria that match their needs.

The employer should also review application needs with crane and lift device manufacturers and area distributors for additional help with equipment selection.

The facility no longer provides the customer the use of the portable gantry crane involved in this incident.

Recommendation #2

All crane operation / lift equipment must be used by employers and employees according to manufacturer's guidelines. If manufacturer's guidelines are not available, use established best practice for all crane lift equipment used.

There are a variety of procedures, rules and regulations that govern crane operations. It is important to follow manufacturer's instructions and compare them with the intended field application and location where the lifting device is to be used.

The portable gantry crane involved in this incident had been constructed for use at the salvage yard by an area metal fabricator. There were additional gantry cranes built for their other sites. They did not have manufacturer-provided recommended operating procedures.

Manufacturers develop recommendation criteria for safe operation of their equipment and can supply technical expertise to help ensure the proper crane or lift device is selected and matched for the right application. Manufacturer's operating manuals may also still be available for older equipment.

Manufacturers have a responsibility to provide needed communication and clear instruction for the safe use of their equipment as well as provide specific warning for the users dealing with the hazards of not operating the equipment correctly.

Some of the hazards include material and equipment that can fall on workers and others in the area. Failures can occur when load limits are exceeded.

The employer should have written procedures for each type of equipment used and those procedures should be based on the manufacturer's operating principles and instructions.

The written procedures should be available for all users and support personnel to review and they all should be familiar with the safe operating practices described in the procedures. Cranes and similar devices should only be operated by qualified trained personnel.

Contact manufacturers or area dealers for help in getting written guidelines and warning information regarding the type of crane being used.

Manufacturers may fulfill requests for information that apply to non-standard pieces of equipment to incorporate safety and operations practices for the equipment in question. Alternatively, one could contact an engineering firm knowledgeable in cranes systems, and have them review the crane from an operations / application and hazards standpoint. The engineering firm can draft a guideline for the crane / lift device for the facility.

It is important that employers continue to evaluate, upgrade and improve their material handling processes for both the customer and for the workers who might be at risk while working with or around the equipment.

Recommendation #3

All employers and crane operators need to clearly understand and control site conditions and limitations for all cranes, lifts and crane travel at the site.

All crane and mechanical lift operations must be properly planned, supervised, and safely carried out by knowledgeable persons. All employers and employees need to appreciate, respect and understand the high risks of working around or near cranes or mechanical lift equipment.

Before any actual work begins, everyone involved in the process needs to have a clear understanding of each lift task. Details should include who is involved in the lift process, what equipment is to be used, where and how the equipment will be used, and under what types of circumstances the lift is going to take place.

The employer and the crane operating personnel need to ensure that the set up for all lifts are properly prepared, the proper equipment is used and that the travel areas can provide a safe path of travel for the unloaded mobile crane so it can safely maneuver through the salvage yard.

All crane lifts should follow this basic safe systems operation:

- Pre-plan each lift.
- Select the right lift equipment for the job.
- Preview and examine the site and path of travel prior to lift.
- Examine the crane, rigging and other lift equipment to make sure it is in proper and safe working condition.
- Ensure that only authorized, trained and knowledgeable operators and support persons are assigned to the equipment and the job.

There are several important principles involved with almost any lift that the operator needs to know and incorporate into the planned lift process:

- 1) The center of gravity. The center of gravity is influenced by both the crane and the object being lifted. It is important the crane operator understand the principles of the “center of gravity” when performing any lift and also when the crane is traveling under load.

- 2) Leverage. Cranes use the physical principle of leverage when making any lift. Leverage can also influence the center of gravity and its tipping axis as it is applied to the material being lifted.
- 3) Stability. Stability is basically the relationship of the load weight, load position and angle, and the center of gravity. An uneven surface can have influence on the system stability.
- 4) Structural integrity. Structural integrity relates to not only the engineered elements of the crane, but also to the support rigging and attachments that are used to make a lift. These are all items that need to be factors in the evaluation process when choosing the right equipment for a material lift.

In this incident, the owner relied on the customer's knowledge and abilities to successfully and safely use the mobile crane.

Recommendation #4

A portable or mobile crane must only be used on a surface that can safely support its lift capacity and travel capability.

A portable or mobile crane must only be used on a surface that can safely support its lift capacity and mobile travel capability. The surface needs to be firm, level and provide a stable path of travel for the mobile crane.

A proper lifting plan needs also to be in place and the process should be supervised by knowledgeable persons.

The correct load application must be followed to include the crane configuration, rigging setup, load weight, and path of travel in relation to the equipment traveling under load.

A significant factor in any application of a mobile crane lift is knowing the site conditions that might adversely influence the lift. Site factors that can influence safe crane lift and travel include:

- Site access and egress.
- Surface gradients.
- Surface preparation (concrete, asphalt, gravel, grass etc.).
- Overhead exposures (electrical or telephone cables, roof eves and other proximity hazards etc.).
- Wind and weather conditions (i.e., rain, snow, ice etc.).
- Heat and cold, which can affect surface conditions.

Portable and Mobile cranes may become unstable and tip under these conditions:

- When being moved under load.
- Crane operations are not following the manufacturer's recommendations for the equipment use and lift parameters.
- Soil and traveling surface are inadequately supported.
- Suspended loads are allowed to swing freely and develop momentum
- There is a change in travel terrain elevation or level.
- There is a change in the orientation of the crane and the material being lifted.

A loaded crane of this type should not be moved. This was especially true in this incident. Pushing or pulling on the crane made the uncontrolled load swing back and forth and the center of gravity shifted with the downward slope of the surface, making the crane unstable and ultimately tip over.

Since this particular incident happened, the salvage yard owners have built a new facility, designed to be safer than the old one. The site is large and situated on a very level surface. The site is black topped to make the travel surface very level.

Recommendation #5

Employers must conduct training for all crane operators, users and support personnel to ensure that all workers understand the hazards associated with portable and mobile cranes and crane lifts.

A key in providing safe operation and maintenance of cranes and other lift equipment is to have properly trained operators and support persons.

Crane operation of any type requires skill, alertness, good judgment, focus, and concentration.

Employers need to ensure that their operators follow crane lift safety rules and practices.

An employer should not let an operator operate a crane unless they have knowledge, proficiency and experience in operating the equipment.

The crane operator is responsible for all of the safe workings of the crane and the associated lifts made by the crane. The crane operator also needs to know the safe operating limits of the crane as primarily defined by the crane's manufacturer.

The crane operator and support persons should:

- Be trained on the specific model of crane being used.
- Understand the proper rigging to be used with the crane.
- Be able to evaluate site conditions in order to effectively manage and control lifts being performed.
- Be able to judge and take appropriate steps during the lift to avoid hazardous situations.
- Be able to effectively control the lift and load while in transport.

The crane / lift device operator and support persons need to know the equipment's load center, turning radius, and stability triangle under various conditions. They need to know how the equipment handles with and without a load, and appropriate travel conditions and abilities. They need

to understand how to control equipment within the operating surroundings, different work areas, and on the surface that the equipment is expect to travel on.

Each workplace has its own unique hazards and safety and health guidelines that are important for everyone to understand and take seriously. Continued training and skills development increases the operator's effective knowledge of the operations.

Owners should require the customer to provide evidence of their knowledge of mobile crane operation and lift procedures.

The owner should also have specific guidelines established detailing customer expectation for safe operation of the crane. In this case the owners have discontinued the practice of providing the mobile gantry crane for customer use and have in fact taken all of the gantry cranes out of service at their sites.

Recommendation #6

Employers need to diligently supervise and coach young workers beyond the level provided for experienced adult workers in order to help young workers recognize and avoid the hazards of performing tasks at the organization's site.

Employers must be diligent and responsible in the supervision of young workers. They need to have a clear understanding of the hazards to young workers and supervise young workers that are less experienced and knowledgeable than other workers at their site.

The employer needs to communicate the hazards and consequences associated with each task and provide all necessary training and supervision so that young workers can perform them safely. It may also be necessary to maintain constant supervision of young workers on hazardous job sites.

In this case, the victim may not have fully appreciated the hazards and consequences associated with disregarding the employer's policy against helping customers. The victim was working supervised as part of a team but the co-worker either did not see the victim assist the customer or was too late to intervene in the incident

Teen workers are essentially newcomers to the workplace and do not have extended job experience and skills training. They may not have the ability or knowledge to recognize common workplace hazards. If the employer hires young workers, they need to check specific employment requirements for teen workers.

PREVIOUS INCIDENTS

The salvage yard owner had a similar though less severe incident with a toppled crane previously. At that time, the owners were using a much smaller gantry crane, which had a very difficult time traveling through the salvage yard. The owners replaced their old crane with the type that was involved in the incident. They thought that the more robust crane would be better suited for the rough terrain of the yard.

COMPANY REACTION

Since the incident, the salvage yard owners have taken all similar portable gantry cranes out of service for each of its yards. Customers now need to supply their own equipment. They also have enforced their policy that their employees do not assist customers in vehicle parts removal. They have also greatly strengthened their safety program and processes and have made and are making physical changes to their yards to protect customer and employee safety.

ACKNOWLEDGMENTS

This report was reviewed by stakeholders from labor and business communities and various Washington State and Federal worker safety agencies.

Though we are unable to acknowledge specific individuals for their contributions to this report, we would like to recognize the following for their help and support of the FACE mission and objectives:

- The Employer's representative involved in the incident
- DOSH Compliance Operations
- DOSH Enforcement
- Federal Face Program Management (NIOSH)
- Safety & Health Assessment & Research for Prevention (SHARP)
- Washington State Attorney General's Office

APPENDIX A

SITE PHOTOGRAPHS



Photo 1. The incident site showing the green vehicle from which the customer was extracting the engine and transmission unit. The photo also shows the salvage yard gravel surface and the drainage area in the path where the customer lost control of the gantry crane.



Photo 2. The incident site showing the gantry crane in the final resting position and the engine and transmission situated between the wheels. Notice the uneven gravel surface with large rocks and depression obstacles.



Photo 3. The engine and transmission were attached to the gantry crane with a manual chain pulley. Notice the lack of lines or attachments that could have been used to stabilize the load and prevent it from swinging.



Photo 4. The manual chain pulley was able to swing freely at attachment point and allowed suspended loads to move freely.



Photo 5. The gantry crane was raised with the addition of wheels and tires. This also raised the center of mass of the crane.



Photo 6. Vehicle wheels and tires were attached to the gantry crane at the ends of the horizontal bars. The wheels all rotated 360 degrees and were not coordinated to turn together.



Photo 7: The new salvage yard facility is paved and has a more stable path of travel. Most of the yard is an asphalt surface with defined drainage areas located away from most of the travel areas, which helps provide a safe transition in and out of the yard for customers and employees.

APPENDIX B

GANTRY CRANE MANUFACTURER SPECIFIC SAFETY INSTRUCTIONS

Specific safety instructions for adjustable gantry crane

Specifications

Weight Capacity	1 Ton / 2,000 lb.
Material	All Steel Construction
Adjusting Height	8'3" - 12'2" (99"-146")
Casters	5" Locking Swivel

1. Do not move the Crane when it is under load. The Caster Wheels are not designed to be rolled when the Crane is lifting an object.
2. Do not stand under object that is being lifted. Be aware of the possibility of a load slipping off Crossbeam. An item that falls from the Crane may cause serious injury.
3. Make sure load is secured, balanced, and positioned properly in the hook, sling, or lifting device before it is lifted.
4. Make sure load is clear of obstructions, such as stockpiles, machinery, anchors and other obstacles when lifting or moving the load.
5. When moving Crane, avoid sudden acceleration and movements.
6. Verify ground is solid enough to support weight of the Crane when fully loaded.
7. Verify that the Gantry Crane passage is clear.
8. Do not use for side pulling.
9. Operate on flat and level surface only.
10. DO NOT lift loads if the Cross Beam is not level.
11. DO NOT lift if load is swinging.
12. DO NOT lift if the load is not suspended directly under the Cross Beam.
13. DO NOT lift loads over people or allow anyone to walk under an elevated load.
14. DO NOT use unless all assembly points have been inspected and verified. Check for damage and be sure all hardware is tight before EACH use
15. DO NOT leave the loads suspended when the gantry crane is unattended.
16. DO NOT move or load unless Height Adjusting Pins are fully inserted.
17. DO NOT remove, deface, or obscure warnings, caution labels, and capacity labels on Crane.
18. DO NOT use if any parts are bent, have signs of wear or damage, or are missing.
19. Keep the Gantry Crane level at all times.
20. Maintain product labels and nameplates.

Specific Safety Instructions for telescoping gantry crane

Specifications

Weight Capacity: 1.5 Ton
Minimum Height: 99-1/2"
Max. Height: 148"
Distance Between Posts: 94"
Castors Diameter: 5"

Dimensions: 59" L x 127-1/2" W x 99-1/2" H
I-Beam: 2-7/8" W
Beam Lifting Cables: 3/16" diameter
Base: 59" x 103"
Materials: All Steel Construction

Warning: The warnings, cautions and instructions discussed in this instruction manual cannot cover all possible conditions and situations that may occur. It must be understood by the operator that COMMON SENSE AND CAUTION ARE FACTORS WHICH CANNOT BE BUILT INTO THIS PRODUCT, BUT MUST BE SUPPLIED BY THE OPERATOR.

The Operator

PLEASE REMEMBER:

Do not operate the product if under the influence of alcohol or drugs. Read warning labels on prescriptions to determine if your judgment/reflexes might be impaired.
Do not wear loose clothing or jewelry as they can be caught in moving parts.
Protective gloves and non-skid footwear is recommended.
Wear restrictive hair covering to contain long hair.
Use eye and ear protection. Always wear ANSI approved impact safety goggles.
Maintain proper footing and balance at all times.

Work Area

TO AVOID RISK OF PERSONAL INJURY, EQUIPMENT DAMAGE, FIRE AND SHOCK, MAKE SURE YOUR **WORK AREA** IS:

Free of damp, wet or rainy conditions.
Free of children (never let them handle tools or machinery).
Well-lit, clean and uncluttered.
Never allow anyone under a loaded Crane.

Before Using

Before using your Crane, check for damaged parts.
Do not try to use inappropriate attachments in an attempt to exceed the tool's capacity. Approved accessories are available from Harbor Freight Tools.
Before using any tool, any part that appears damaged should be carefully checked to determine that it will operate properly and perform its intended function.
Make sure all clamps, locks and bolts are tight.
Make certain that the load is less than rated capacity.

Operation

Never force the tool or attachment to do the work of a larger industrial tool. It is designed to do the job better and more safely at the rate for which it was intended.

Step 1) Move the Crane so that it is directly above the item to be lifted.

Step 3) Securely fasten the item to the Crane with the appropriate trolley or hoist.

Step 4) Raising and lowering the I Beam requires 2 people. There is a Handle on each of the Outer Vertical post Assemblies. To raise the I Beam, remove the Cotter Pins. Once the Pins have been removed, turning the Handles on the Pulley Assembly clockwise to raise the I Beam. Reversing the direction of turn will lower the I Beam. Once the desired height has been reached, reinsert the Pin and Cotter Pin. The Inner Vertical Post Assembly has nine different stop positions.

Caution: Do not move the Crane when it is under load. The Caster Wheels are not designed to be rolled when the Crane is lifting a heavy object.

Warning: Never stand under an object that is being lifted by the Crane. Be aware of the possibility of a load slipping off of a trolley. An item that falls from the Crane may cause serious injury

APPENDIX C

APPLICABLE REGULATIONS

WISHA standards

There are general requirements that cover crane usage and temporary labor agency safety and health issues. Although the investigation of this incident was not regulatory in nature, we offer the following code requirements for information and reference purposes. This is not intended to be a complete list of regulatory guidelines that address these issues but are representative of requirements established under the Washington Administrative Codes:

WAC 296-800-11035. Establish, supervise, and enforce rules that lead to a safe and healthy work environment that are effective in practice.

WAC 296-800-14020. Develop, supervise, implement, and enforce safety and health training programs that are effective in practice.

WAC 296-125-030. Prohibited and hazardous employment — All minors Occupations involving wrecking, demolition, and shipbreaking operations. Occupations involving operation or repair, oiling, cleaning, adjusting, or setting up of or working in proximity to cranes. Working in proximity shall mean working within the radius of movement of any portion of the machinery where one could be struck or otherwise injured.

Federal standards

The following Hazardous Orders (HO) Employment Standards for 16 and 17 year-olds in nonagricultural employment published in Subpart E of Part 570 of Title 29 of the Code of Federal Regulations apply to this case. HOs apply either on an industry basis, specifying the occupations in the industry that are not permitted, or an occupational basis irrespective of the industry in which found.

HO 2 Motor-vehicle driving and outside helper on a motor vehicle.

HO 15 Wrecking, demolition, and shipbreaking operations.

RESOURCES

Teen Worker Safety. Washington State Department of Labor and Industries.
<http://www.lni.wa.gov/WorkplaceRights/TeenWorkers/JobSafety/default.asp>

Preventing Deaths, Injuries and Illnesses of Young Workers: NIOSH Alert. National Institute for Occupational Safety and Health. NIOSH Publication No. 2003-128.
<http://www.cdc.gov/niosh/docs/2003-128/2003-128.htm>

Occupational Injuries among Young Workers. Bureau of Labor Statistics. Monthly Labor Review. October 2005.
<http://www.bls.gov/opub/mlr/2005/10/art2full.pdf>

Preventing Worker Injuries and Deaths from Mobile Crane Tip-Over, Boom Collapse, and Uncontrolled Hoisted Loads. National Institute for Occupational Safety and Health. NIOSH Publication No. 2006-142.
<http://www.cdc.gov/niosh/docs/2006-142/>

Harbor Freight Tools. 3491 Mission Oaks Blvd., Camarillo, CA 93011.
<http://www.harborfreight.com/manuals/66000-66999/66273.pdf>
<http://www.harborfreight.com/manuals/41000-41999/41188.pdf>