JOB HAZARD RISK ASSESSMENT PROGRAM

PURPOSE / SCOPE

One of the most important duties we have as Winger Companies, herein referred to as Winger, employees is Job Hazard Assessment. A hazard is the potential for harm. This could be either a personal injury, an injury to someone else, property damage or environmental concerns. Identifying hazards and eliminating or controlling them as early as possible will help prevent workplace injuries or illnesses.

A job hazard analysis is a technique that focuses on job tasks as a way to identify hazards before they occur. It focuses on the relationship between the worker, the task, the tools, and the work environment. The analysis also can be a valuable tool for training new employees in the steps required to perform their jobs safely.

Management must demonstrate their commitment to safety and health and follow through to correct any uncontrolled hazards identified. If any hazard poses an immediate danger to life or health must be addressed immediately.

The purpose of the Winger Job Hazard Risk Assessment Program is to give our employees the knowledge and tools necessary to understand and perform a thorough job hazard assessment in order to perform their job safely without injury or incident.

DEFINITION

A job hazard analysis is the process of analyzing a job to identify as many hazards as possible and determine how to address those hazards so that affected workers can safely complete the job. The process includes the evaluation of the job itself, including the affected workers, tools, materials, equipment, and anything else that could impact the safety of those who will be performing the job. Safe work procedures are then established and incorporated into the job process.

While we have chosen to use the term job hazard analysis (JHA), this process is also known by many other names including job safety analysis (JSA), task hazard analysis (THA), and pre-task planning, etc. While the term used depends on the entity requiring hazard analyses and the scale of the analyses, the process is essentially the same.

Today's occupational safety and health programs emphasize hazard identification as required by industry standards and guidelines. ANSI safety program standards, OSHA safety and health program guidelines, and third party safety and health program prequalification provider requirements such as those from ISNetworld, PICS, BROWZ, PEC Premier, and CanQual include references to hazard identification, as do many other recognized construction industry safety resources. This program focuses on hazard identification as it pertains to job hazard analysis.

When filling out a JHA/PJHA ask yourself the following questions:

- What are the hazards?
- What can go wrong?
- What are the consequences?
- How could it happen?
- What are the contributing factors?
- How can I reduce the hazard?

BASIC REQUIREMENTS:

- A PJHA should be used for routine and non-routine activities as well as new processes, changes in operation, products or services.
- A PJHA or detailed written procedure must identify risks, hazards, and controls taken to execute the work safely and is required prior to beginning any task.
- You can identify hazards that are classified/prioritized and addressed based on the risk associated with the task / (Risk analysis matrix outlining severity and probability).
- A Winger PJHA Form or equivalent customer form will be utilized for identifying risks and hazards and controls/eliminations on each job task. These forms must be turned into the appropriate personnel. For example, some customers require that we keep our PJHAs at our nested work sites for auditing purposes, some require that we turn the PJHA into them before work commences, some PJHAs get turned into the safety department at our corporate office.
- Jobs that are divided into different areas will need a separate PJHA for each area. For instance, a crew working on the first floor of Refinery and a different crew working on the third floor would require separate PJHA's.
- If a PJHA is used by a group of individuals for one job, each individual shall contribute to ensuring that the form is complete and sign it to assure they are aware of the tasks and hazards associated with the job.
- The entire work crew, including subcontractors, must review and sign the PJHA prior to work commencing. Subcontractors may use their own form as long as it complies with the project requirements.
- Any new person added to the job is required to review the PJHA and their signature(s) must be added to the form acknowledging they have reviewed the PJHA and understand the scope of work, hazards and eliminations, before they begin working.
- Frequent and regular inspections must be completed of job sites, materials, and equipment to be made by competent person.
- A PJHA must be completed at the job site. All identified hazards must have a method for elimination and/or control. Identified controls must be implemented prior to beginning the task.
- If new hazards are identified during the course of the job, they should be added to the PJHA and reviewed by the personnel assigned to that job.
- Job scope changes require a review of the current PJHA. This may require modifying the PJHA or stopping work altogether and filling out an additional PJHA.
- Where hazards exist that cannot immediately be handled or scope of work changes, stop work immediately and evaluate how the hazard can be eliminated or controlled to complete the work or task safely.
- Notify your foreman and appropriate department management for further review.
- All sections of the PJHA must be completed for the PJHA to be considered valid., for example:
    - The name of person filling out PJHA
    - Supervisor/foreman name
    - Date
    - Job/task description
    - Location of where the work is being performed
    - Tools used to perform the work
    - Hazards from the work area
    - Hazards from job
    - Hazards from others in work area
    - PPE required
- Crew member printed name and signature(s)
- A hard copy of the PJHA must be located at the job site.
- A PJHA is only valid for that particular job on that particular day.
- PJHAs may not be copied for use on consecutive days.

TRAINING:

- All employees must go through PJHA training initially during new hire orientation.
- Employees will be trained in the hazard identification process, including the use and care of proper PPE.

IDENTIFYING THE JOBS THAT REQUIRE HAZARD ANALYSIS

Begin by determining whether an upcoming job contains one or more potentially hazardous steps by asking yourself the questions below, which represent common hazards in the mechanical construction industry. These questions do not cover every conceivable hazard that you may need to consider, but they do cover our industry's most common hazards. When filling out a JHA or PJHA take a good look at the job task and surrounding area. Ask yourself the following questions:

- Could an affected worker experience a fall from an elevation that could result in fractures, contusions, lacerations, loss of consciousness, or death?
- Will you be using scaffolds?
- Could an affected worker be struck by or against an object that could result in crushed body parts, fractures, or loss of consciousness? Watch line of fire:
- Could an affected worker get caught in an excavation cave-in?
- Could an affected worker be exposed to energized electrical conductors?
- Will the job involve the manual handling of particularly heavy or bulky objects which could result in a back injury, a hernia, a shoulder injury, or a laceration to a worker's hand?
- Has a normally routine job become non-routine due to weather, scheduling changes, equipment problems, or similar circumstances?
- Will you be working in a confined space? Do you have the safety equipment and tools to perform your job safely?
- Will you be working on equipment that could accidentally start up?
- Will you be working in a hazardous atmosphere? Do you need a respirator or an air monitor?
- Will you be exposed to hazardous materials? Have you read the SDS for these materials?
- Where is the nearest safety shower and eye wash station? Have they been flushed?
- Will you be performing hot work?
- Will there be temperature extremes in the area where you will be working?
- Will outside weather be a factor?
- Will you be working in a Restricted Area?
- Will you be using a crane? Is there a qualified rigger and/or signal person?
- What housekeeping concerns are present at the work site?
- What PPE do you need to do this job safely?
- Are permits required to perform this work? Has it been approved? Is the scope of work clear?
- Has your foreman discussed the job with you? Do you understand what your responsibility is?
- What techniques will you use to prevent pulls, strains, line of fire, pinch points, burns, cuts and abrasions?
- Will this job affect other people? How will you protect them from harm?
- Do we have subcontractors? Are they signing our PJHA or do they have their own?
- And then, is everyone on the crew trained to perform their job tasks (i.e. confined space, restricted area, aerial lifts, etc.)?
- Only qualified employees by training or experience shall operate equipment and machinery. Is your employee qualified to run the equipment for the job?

DEVELOPING JOB HAZARD ANALYSES (JHAs) FOR YOUR PROJECTS

Much of what you will need to develop JHAs for your projects can be found in Appendix B below. For example, when an extension ladder is needed for a particular job, Appendix B provides the common hazards and safe work procedures associated with extension ladder use for you. See Appendix A below for an example of a JHA using the hazards and safe work practices from Appendix B.

- Identify job components for each potentially hazardous job.
- Identify and record the hazards associated with each job component by considering whether a worker performing the job could fall to a lower level, be struck by or struck against a large or heavy object, get caught in an excavation cave-in, be exposed to an energized electrical conductor, or become overexposed to another health hazard. Be sure to consider any factors that could make a typical job step a hazardous one, such as changes in weather conditions or project plans.
- Record the potential hazards associated with the job components. For example, a worker on a ladder could be exposed to a potential fall from the ladder. The job component would be the ladder. One of the hazards would be the fall. Another example would be a worker preparing to perform electric arc welding. The job component would be electric arc welding. One of the hazards would be electric shock.
- Once you have identified the hazards for each of the job components assign safe work procedures to each job component. For example, the electric arc welder would need to use the correct size extension cord, inspect the leads for flaws in the insulation, wear the proper welding gloves, etc.
- Now piece them all together. For example if a job included an aerial lift, electric arc welding, and exposure to manganese, combine each finished set of job components/hazards/safe work procedures to create your JHA for that job.
- Each employee must be instructed in the recognition and avoidance of unsafe conditions and the regulations applicable to his work environment to control or eliminate any hazards or other exposure to illness or injury.

Appendix A – Example of a JHA Using the Hazards and Safe Work Practices from Appendix B

The Job: Overhead Installation of Stainless Steel Pipe

Job Components	Hazards	Safe Work Procedures
Aerial Lifts (Boom &Scissor)	Fall Struck by Pinch point	Inspect for defects Test controls Inform affected workers about lift operation pinch points Use a fall restraint system/full body harness Move the lift only in the fully down position Establish good housekeeping on platform decks Use the lift only on smooth, solid, level surfaces Use the lift only for positioning workers and small tools Barricade the area under the lift Prohibit the operator from running over cords, hoses, or welding leads Maintain a clear view of the area being navigated Use an escort when traveling short distances on roadways
Hoist (Chain Fall)	Struck by Pinch Point	Inspect for defects Proper rigging Wear hardhat/safety glasses/gloves/protected toe boots or shoes Barricade area under chain fall/hoist area
Rigging Sling (Synthetic Web)	Struck by object	Inspect for defects Ensure identification tag is in place and legible Determine and observe the rated capacity Ensure the correct type of sling is selected for the job Proper rigging Protect the sling from sharp edges and softeners
Welding (Tig)	Electric shock Burn Fire Respiratory sensitization Welder's flash	Secure required permits Inspect for defects Ensure gas connections are snug Wear helmet, safety glasses, welding gloves and clothing, and boots Ensure that the proper shade of lens is used Provide adequate ventilation

		↓ Ensure and monitor adequate oxygen/breathing air supply ↓ Use respiratory protection when required ↓ Inspect leads for defects ↓ Ensure guards on stinger are in place ↓ Ensure welding screens are in place ↓ Barricade the work area ↓ Remove flammable and combustible materials from the work area ↓ Keep a fire extinguisher nearby ↓ Ground the clamp as close to the work area as possible ↓ Remain insulated from electrical current ↓ Position the worker to keep fumes away from the breathing zone ↓ Stand to one side of the flow meter when charging the bottle
Hexavalent Chromium	↓ Carcinogen	↓ Review/observe SDS ↓ Determine the concentration of chromium in stainless steel ↓ Provide adequate ventilation ↓ Position affected workers to keep fumes away from breathing zone ↓ Use respiratory protection when needed

Appendix B – Hazards and Safe Work Procedures for Common Job Components in Mechanical Construction

Note: MCAA recommends that workers wear hardhats, safety glasses, work gloves, and protected toe boots or shoes at all times while working on a jobsite.

Job Components	Hazards	Safe Work Procedures
Acids	Burns Eye damage Respiratory irritant/possible chronic damage	Review/observe SDS Wear splash proof goggles, face shield, and impermeable gloves and clothing Provide adequate ventilation Use respiratory protection when needed
Adhesives	Respiratory irritant Skin irritant	Review/observe SDS Wear safety glasses and impermeable gloves Provide adequate ventilation
Ammonia	Burns to the eye, skin, and/or lungs Corrosive Fire Potentially explosive	Review/observe SDS Provide adequate ventilation Wear splash goggles, face shield, impermeable gloves, and cotton clothing Use respiratory protection when needed Keep away from oil/combustible materials Keep a fire extinguisher nearby
Asbestos	Asbestosis Lung cancer Mesothelioma	Identify materials containing friable asbestos Determine exposure (sample/monitor) Provide adequate ventilation with HEPA filter collection Use respiratory protection when needed Establish decontamination practices Ensure that only certified abatement personnel remove asbestos
Cable Machine	Struck by Pinched Electric shock Soft tissue – back Spine	Inspect the machine for defects Inspect attachments to ensure that they are in good condition/working properly Wear safety glasses/gloves Use GFCI Monitor cable slack Prevent cable from wrapping around body parts Use proper lifting techniques
Carbon Monoxide	Asphyxiation	Provide adequate ventilation

		▪ Monitor CO in excavations/enclosed spaces ▪ Ensure that exhaust systems are well maintained
Compressed Air	▪ Struck by object ▪ Object in eye ▪ Injection	▪ Determine/observe maximum safe air pressure ▪ Wear hardhat, safety glasses, face shield, and gloves ▪ Ensure that hoses and attachments are properly secured ▪ Keep air release attachments pointed in a safe direction ▪ Never use compressed air to clean off clothing or body parts
Confined Spaces	▪ Asphyxiation ▪ Fire ▪ Explosion ▪ Toxic exposure	▪ Permits- must be approved before starting work ▪ LOTO-walking down block and bleed ▪ Identify/designate a competent person ▪ Provide a properly trained attendant ▪ Training- Are all crew members trained? ▪ Pre entry meeting- Crew members know emergency number. ▪ Rescue- Have you contacted the rescue team. ▪ Ensure that rescue equipment is available and in place- tripod, retrieval needed? ▪ Emergency'-Record numbers on Permit ▪ Test the atmosphere for O_2 level and flammable, explosive, and toxic substances ▪ Air monitor- calibrated every 30 days? ▪ Continuously monitor space - air readings at least every 30 minutes ▪ Secure permit if required ▪ Provide adequate ventilation. Must change air 4X per hour ▪ Use respiratory protection when needed
Copper Cutting/Prep Machine	▪ Laceration ▪ Object in eye ▪ Electric shock	▪ Inspect for defects ▪ Wear safety glasses and gloves ▪ Use GFCI ▪ Ensure that material is properly secured

		▪ Remove adjusting keys or switches before starting ▪ Establish good housekeeping in the work area
Core Drilling (Floor)	▪ Struck by object ▪ Electric shock ▪ Trip ▪ Fall	▪ Inspect for defects ▪ Identify and mark utilities and post stress tension cables ▪ Properly size the machine and core bit ▪ Ensure that the machine is properly leveled and anchored ▪ Barricade the area below the drilling operation ▪ Use GFCI ▪ Wear a hardhat, safety glasses, gloves, and ear plugs ▪ Properly position workers to use the machine safely ▪ Prevent water and electric current from coming together ▪ Immediately cover holes that are 2” or larger ▪ Install friction rings when changing bits ▪ Use the proper wrench when changing bits
Core Drilling (Wall)	▪ Struck by object ▪ Electric shock ▪ Trip	▪ Inspect for defects ▪ Barricade the work area on both sides of the wall ▪ Use chain fall to lift the drill into place ▪ Properly size the machine and core bit ▪ Ensure that the machine is properly leveled/anchored ▪ Ensure that leveling legs are in place ▪ Use GFCI ▪ Wear a hardhat, safety glasses, gloves, and ear plugs ▪ Properly position workers to use the machine safely ▪ Provide a continuous flow of water ▪ Prevent water and electric current from coming together ▪ Install friction rings when changing bits ▪ Use the proper wrench when changing bits ▪ Lock the slide down when the machine is moved

		✚ Use proper lifting techniques when moving the machine
Corrosives	✚ Burns to the eyes, skin, and/or lungs	✚ Review/observe SDS ✚ Provide adequate ventilation ✚ Wear splash proof goggles, a face shield, and impermeable gloves and clothing ✚ Ensure that the container is properly labeled ✚ Close/seal containers when not in use
Cranes	✚ Line of Fire ✚ Struck By ✚ Caught-In or Between ✚ Rigging Fails	✚ Cargill Permits - Lifts of >4 feet or >100 lbs ✚ Winger Crane Pre-Lift Checklist ✚ Qualified Rigger ✚ Qualified Signal Person ✚ Tag lines ✚ Rigging equipment inspections before each use ✚ Load weight ✚ Hoist & rigging equipment capacity ✚ Line of fire – no one under loads! ✚ Barricade swing radius
Cut Off Tool (High Speed)	✚ Laceration ✚ Object in eye ✚ Struck by object	✚ Secure required permits ✚ Inspect for defects ✚ Use only dual-action trigger type/no positive locking switch on tool ✚ Ensure that the guard is in place ✚ Ensure that the support handle is in place ✚ Replaced the cutting wheel immediately when needed ✚ Ensure that the cutting wheel RPMs match the tool RPMs ✚ Ensure that the cutting wheel rotation matches the tool rotation ✚ Ensure that locking nut is tight ✚ Establish good housekeeping in the work area ✚ Secure material in place before cutting ✚ Ensure there is no pressure stored in the material being cut ✚ Wear safety glasses, a face shield, gloves, and ear plugs ✚ Use two hands to operate the tool ✚ Keep the cutting wheel perpendicular to the cut ✚ Prevent the cutting wheel from being

		pinched/bound by the material - Never use this tool for grinding
Drill **(Hammer Drill – Electric)**	- Struck by - Electric shock	- Inspect for defects - Ensure that the plug's ground prong is in place - Use only in dry conditions - Protect the cord from cuts/insulation damage - Use GFCI - Ensure that guards are in place - Wear a face shield, gloves, safety glasses, and ear plugs - Ensure that the proper bit is used - Replace dull bits immediately - Establish good housekeeping in the work area - Identify hidden electrical lines, pipes, rebar, or objects - Use two hands to operate the drill - Properly position the operator to use the drill safely
Drill Press	- Laceration - Object in eye - Electric shock - Burn	- Inspect for defects - Use GFCI - Ensure that the bit is sharp - Ensure that the bit is installed straight and tight - Wear safety glasses, gloves, ear plugs, and snug clothing - Provide adequate lighting - Ensure unrestricted access to E-stop - Set up and secure the drill table at the proper height - Keep the drill table clean - Secure/clamp the material before drilling - Set the proper drill speed - Use only the proper cutting fluid
Duct Spray Sealer	- Skin/eye damage - Electric shock - Respiratory sensitization	- Inspect for defects - Ensure that the plug's ground prong is in place - Use GFCI - Wear safety glasses, a face shield, and gloves - Provide adequate ventilation - Keep pressurized discharge in a safe direction - Ensure that the nozzle tip guard is in

		place - Barricade the work area - Isolate overspray to prevent contact with energized electrical conductors - Engage the trigger lock when not spraying - Relieve the unit of pressure when not in use
Electrical Cords/Power Tools	- Electrical Shock	- GFCI- required for any power tool or extension cord unless double insulated - Inspect for defects; damaged insulation/ nicks/cuts cracks and broken wires - Correct gauge- Must be 14 gauge or bigger - Proper ends- Must provide strain relief Kinks and twist- These are signs of damage - Ensure that the plug's ground prong is in place - Water, Chemicals, & Hot surfaces- Will damage insulation - Protect the cord from chemicals - Protect the cord from extreme heat or burns - Protect the cord from sharp edges - Prevent the cord from being run over by jobsite vehicles or traffic - Ensure the cord is never hung by nails, staples, or other sharp objects - Ensure the cord is never suspended with uninsulated wire - Keep the cord away from standing water and puddles - Keep cords & leads at least 7 feet above isles & walkways - Protect cords from damage through doorways
Excavations	- Struck by - Asphyxiation	- Permits –what is the depth a permit is required for the location you are working. i.e. Cargill - 18" - IOWA ONE CALL- Has locating been done? - Utilities-Electrical, Water, Fiber, Sewer marked? - Rescue plan- what is it?

		↳ Trench box- Needed 5 feet or deeper ↳ Shoring- required in trenches 5 feet – 20 feet, professional engineer required if >20 feet ↳ Spoils- Must be minimum of 2 feet away from edge ↳ Cave in- Must be inspected by a competent person before each shift. ↳ Ensure access/egress - Ladders required in trenches 4 feet or deeper, every 25 feet ↳ Confined space- Is it considered? ↳ Secure the required permit ↳ Determine/designate a competent person to oversee the work ↳ Address affected power lines ↳ Ensure that a protective system is in place, including benching, sloping, and shielding ↳ Wear a hardhat, safety glasses, and gloves ↳ Barricade the area around the excavation and work area ↳ Establish and monitor oxygen content when needed
Fall Protection	↳ Falls	↳ Fall protection-Needed higher than 4 feet ↳ Anchor points- must hold 5,000 lb ↳ Retractable- use instead of lanyards, 1,800 lb anchorage point ↳ 25° Cone- Keep SRL above ↳ Lanyards- can only be used 18 ½ feet or higher ↳ Level 2 Permit- When no safe point is identified ↳ PPE inspections- Required to inspect before each use ↳ Rescue plan- If they fall how will you get them down? ↳ Training- Are all crew members fall protection trained?
Fiberglass	↳ Skin irritation ↳ Respiratory sensitization	↳ Review and observe SDS ↳ Wear safety goggles, a face shield, impervious gloves, and a Tyvek suit mask ↳ Provide adequate ventilation ↳ Wear a dust mask

		↓ Wear a respirator in place of a dust mask when needed ↓ Remove sources of heat or ignition from the work area ↓ Keep a fire extinguisher nearby ↓ Secure pipe in place before cutting or grinding ↓ Set up an airborne dust particle vacuum when cutting or sanding fiberglass ↓ Use a coarse sanding drum on a low speed drill to reduce dust ↓ Establish good housekeeping in the work area ↓ Consider and address solvent spills ↓ Seal and properly store solvents and solvent containers when not in use
Flammable/ Combustible Liquids	↓ Fire ↓ Burn ↓ Asphyxiation ↓ Respiratory sensitization	↓ Use only in small quantities ↓ Keep contained in metal cans with self-closing lids ↓ Ensure that containers are properly labeled ↓ Ensure that liquids are used and stored away from sources of ignition ↓ Ground drum/bond container to drum when transferring liquid from drum to container
Forklift	↓ Struck by ↓ Crushed by ↓ Pinched	↓ Inspect for defects ↓ Test controls ↓ Ensure that the operator is properly qualified ↓ Wear a hardhat, safety glasses, and gloves ↓ Use and fuel solid tire forklifts on solid, smooth surfaces ↓ Provide adequate ventilation for internal combustion powered lifts ↓ Properly secure the load ↓ Check the structural integrity of pallets ↓ Transport the load as low to the ground as possible ↓ When not in use, park the forklift on level ground ↓ When not in use, place the forks down, turn off the ignition off, and set the parking brake

Fusion Machine	➢ Lacerations ➢ Struck by ➢ Soft tissue – back, spine ➢ Carbon monoxide	➢ Inspect the machine for defects ➢ Position the machine for proper clearance ➢ Secure the machine in place ➢ Test to ensure the machine is working properly ➢ Maintain safe clearance when the facing tool is upward ➢ Place the blades in the down position before start up ➢ Ensure proper shoes are in place, clean, and free of debris ➢ Wear a hardhat, safety glasses, and gloves ➢ Provide adequate ventilation in the work area and control fumes ➢ Monitor carbon monoxide in affected excavations ➢ Use two workers to operate machine together ➢ Properly position workers to use machine safely ➢ Use proper lifting techniques ➢ Clearly mark pinch points
Gantry	➢ Struck by ➢ Pinched	➢ Inspect for defects ➢ Wear a hardhat, safety glasses, and gloves ➢ Make affected workers aware of pinch points ➢ Communicate movement during operation, assembly, and disassembly ➢ Keep the wheels clean ➢ Install roof protection ➢ Inspect sling/shackles for defects and proper capacity rating
Gas Cylinders (Compressed Gas)	➢ Fire ➢ Explosion ➢ Struck by ➢ Soft tissue – back, spine	➢ Use proper manual material handling techniques ➢ Move cylinders in wheeled cylinder carts ➢ Secure cylinders in the upright position ➢ Inspect for defects ➢ Keep caps in place until cylinders are ready for use ➢ Inspect valves, hoses, and torch for defects ➢ Clean the torch tip

		↓ Clean (pop) cylinder valves before attaching the regulator ↓ Check hoses and valves for leaks ↓ Remove flammable/combustible materials from the work area ↓ Keep a fire extinguisher nearby ↓ Leave wrenches on cylinder valves while in use ↓ Use only friction lighters for ignition ↓ Keep cylinders a safe distance from sources of excessive heat or ignition ↓ Keep cylinders out of confined spaces ↓ Close valves, bleed hoses, and replace caps when finished ↓ Keep oxygen cylinders separate from fuel gas cylinders when storing
Generators (Portable)	↓ Electric shock ↓ Carbon monoxide ↓ Fire	↓ Inspect for defects ↓ Provide adequate ventilation ↓ Shut off before refueling ↓ Ensure the unit is properly grounded
Glycol	↓ Skin irritation ↓ Eye irritation ↓ Organ damage (chronic exposure) ↓ Soft tissue – back, spine	↓ Wear safety goggles, a face shield, and impermeable gloves and suit ↓ Use drum carts for handling drums ↓ Provide adequate ventilation ↓ Review/observe SDS ↓ Properly dispose of used glycol
Grinder (Bench)	↓ Laceration ↓ Abrasion ↓ Object in eye ↓ Electric shock ↓ Burns	↓ Inspect for defects ↓ Ensure guards/shields are on unit ↓ Ensure guards/shields are properly positioned ↓ Set tool rests within 1/8” of wheel surfaces ↓ Provide adequate lighting ↓ Ensure that the plug’s ground prong is in place ↓ Use GFCI ↓ Ensure the correct wheels are installed ↓ Ensure that the maximum RPM of the wheels is greater than or equal to the maximum RPM of the grinder ↓ Ensure wheels are tight ↓ Ensure wheels are clean and in good condition ↓ Wear safety glasses, a face shield, gloves, ear plugs, and proper clothing ↓ Remove flammable/combustible materials from the work area

		↓ Keep a fire extinguisher nearby ↓ Unplug the unit before making adjustments or changing wheels
Grinder (Saddle Grinder)	↓ Laceration ↓ Abrasion ↓ Object in eye ↓ Electric shock ↓ Burns	↓ Inspect for defects ↓ Ensure that the plug's ground prong is in place ↓ Use GFCI ↓ Replace the belt when it becomes worn or torn ↓ Keep belt tension properly adjusted/monitored ↓ Ensure that guards are in place and properly positioned ↓ Wear safety glasses, a face shield, gloves, ear plugs, and proper clothing ↓ Secure the piece being saddled ↓ Monitor the belt and keep it in place while grinding ↓ Remove burrs from pipe ↓ Turn the power and breaker switches off before working on or adjusting the grinder ↓ Establish good housekeeping in the work area
Grinder (Tungsten)	↓ Laceration ↓ Abrasion ↓ Object in eye ↓ Electric shock ↓ Burns	↓ Secure required permits ↓ Inspect for defects ↓ Ensure that the plug's ground prong is in place ↓ Use GFCI ↓ Ensure that the jig and grinding wheel are tight ↓ Ensure that guards are in place and properly positioned ↓ Wear safety glasses, a face shield, gloves, and ear plugs ↓ Remove flammable/combustible materials from the work area ↓ Keep a fire extinguisher nearby ↓ Secure tungsten in the holder ↓ Insert tungsten in the proper diameter guide ↓ Turn the power and breaker switches off before working on or adjusting the grinder ↓ Establish good housekeeping in the work area
Groover Machine	↓ Electric shock	↓ Inspect for defects

	↳ Pinch point ↳ Laceration	↳ Use GFCI ↳ Use the proper size/condition extension cord ↳ Wear safety glasses, gloves, protected toe boots, and snug clothing ↳ Use the machine on level, firm ground ↳ Anchor the machine when required by the manufacturer ↳ Keep the work area well lit ↳ Check the machine daily before use ↳ Use an adequate number of workers ↳ Ensure operation is by foot switch only ↳ Make the operator aware of moving parts ↳ Establish good housekeeping in the work area ↳ Use a mechanical method to manage large pipe ↳ Support work with adjustable/mobile pipe stands ↳ Re-check setup after changing dyes
Helicopter (Hoisting by Helicopter)	↳ Struck by ↳ Object in eye ↳ Crash	↳ Establish/review rigging signals ↳ Ensure helicopter crew reviews rigging procedures/hoist area ↳ Verify the weight of the unit/load ↳ Conduct a pre-lift meeting with riggers, pilot, and crew ↳ Wear a hardhat with chin strap, mono-goggles, gloves, and appropriate clothing ↳ Provide an adequate number of workers for the process ↳ Clear all loose material off the roof ↳ Ensure that rooftop fall prevention/protection is in place ↳ Keep workers clear of the elevated load at all times ↳ Ensure proper dissipation of static electrical charge ↳ Establish barricades around the hoist area ↳ Determine whether weather conditions are suitable for the lift
Hexavalent Chromium	↳ Carcinogen	↳ Review/observe SDS ↳ Determine the concentration of chromium in stainless steel ↳ Provide adequate ventilation

		↓ Position affected workers to keep fumes away from breathing zone ↓ Use respiratory protection when needed
Hi-Jacker	↓ Struck by ↓ Crushed by ↓ Pinched	↓ Inspect for defects ↓ Wear safety glasses, gloves, and protected toe boots ↓ Keep wheels clean ↓ Make the operator and affected workers aware of pinch points
Hoist (Duct Hoist)	↓ Struck by object ↓ Struck against object ↓ Crushed by object ↓ Pinched	↓ Ensure that the hoist is properly sized for the job ↓ Inspect for defects ↓ Ensure that wheels and cables are in good condition and working properly ↓ Establish and observe the manufacturer's rated capacity ↓ Use a bottle holder for air hoists ↓ Extend outrigger ↓ Prohibit electric drill use for raising hoist ↓ Stabilize the load before the lift ↓ Use tie down straps/clamps when needed ↓ Use cradles for round ducts ↓ Never leave a load unattended in the raised position ↓ Prohibited modifications to the hoist ↓ Establish good housekeeping in the hoist area ↓ Use the hoist only on flat/level work areas
Hoist (Chain Fall)	↓ Struck by ↓ Pinch Point	↓ Inspect for defects ↓ Wear hardhat/safety glasses/gloves/protected toe boots or shoes ↓ Barricade area under chain fall/hoist area
Hoist (Come Along/ Chain Hoist)	↓ Struck by object ↓ Struck against object ↓ Crushed by object ↓ Pinched	↓ Ensure that the hoist is properly sized for the job ↓ Inspect for defects ↓ Ensure that the attachment/anchor point is capable of handling the load ↓ Determine and observe the manufacturer's rated capacity ↓ Wear safety glasses, gloves, and protected toe boots

		✚ Barricade the work area ✚ Ensure that the Come Along is in the correct gear ✚ Establish good housekeeping in the hoist area
Hoisting (Material)	✚ Fall ✚ Struck by object ✚ Struck against object ✚ Crushed by object ✚ Pinched ✚ Electric shock	✚ Inspect for defects ✚ Wear safety glasses, gloves, high visibility vest ✚ Ensure that a fall prevention/protection system is in place when needed ✚ Keep loads/load lines 10' or more away from energized electrical conductors ✚ Establish hoist equipment load limits ✚ Establish good housekeeping in the work area ✚ Use load platforms when needed ✚ Barricade the hoist area ✚ Make affected people in the area aware of the operation ✚ Ensure that the signal person and operator agree upon and understand signals
Hot Work – Cutting/Welding/Brazing	✚ Fires ✚ Burns ✚ Explosions	✚ Permit required? ✚ Air monitor required? ✚ Fire extinguisher immediately available? ✚ Fire watch? ✚ Fire blankets, screens needed?
Hydrostatic Testing	✚ Struck by object ✚ Object in eye	✚ Secure required permit ✚ Notify other affected trades ✚ Wear safety glasses, a face shield, gloves, and proper clothing ✚ Barricade the work area ✚ Isolate equipment ✚ Ensure that hoses and pipe are rated for the anticipated test pressure ✚ Ensure that all welds are free of insulation ✚ Visually inspect all pipe welds ✚ Ensure that gauges are inspected and calibrated ✚ Ensure that test gauges range from 1½ to 4 times test pressure ✚ Use a gauge at the pressure source

		↓ Use a gauge at the highest or furthest point from the pressure source ↓ Ensure that vents have been installed to blow off air ↓ Ensure that drains have been installed ↓ Ensure that the hold time is enough to steady the pressure and walk line ↓ Increase test pressure in increments of 20% or less ↓ Ensure that the gauge is stable before increasing pressure ↓ Consider and address affected energized electrical conductors
Jack Hammer (Electric)	↓ Struck by ↓ Soft tissue – back, shoulder, spine ↓ Hernia	↓ Inspect for defects ↓ Ensure that the operator has reviewed the manufacturer's instructions ↓ Wear safety glasses, a face shield, gloves, ear plugs, and proper clothing ↓ Identify and mark utilities ↓ Confirm that no soil hazards are present ↓ Confirm that pulverized material won't create a hazardous atmosphere ↓ Ensure that bits are sharp and in good condition ↓ Use GFCI ↓ Ensure that attachments are locked into the unit ↓ Barricade the work area
Jack Hammer (Pneumatic)	↓ Struck by ↓ Soft tissue – back, shoulder, spine ↓ Hernia	↓ Inspect for defects ↓ Ensure that the operator has reviewed the manufacturer's instructions ↓ Wear safety glasses, a face shield, gloves, ear plugs, and proper clothing ↓ Identify and mark utilities ↓ Confirm that no soil hazards are present ↓ Confirm that pulverized material won't create a hazardous atmosphere ↓ Ensure that bits are sharp and in good condition ↓ Ensure that the air supply is disconnected before connecting or disconnecting tools ↓ Ensure that air hose connections are secured ↓ Ensure that attachments are locked

		into the unit - Barricade the work area
Ladder (Portable Straight)	- Fall - Contact with electrical conductor	- Inspect for defects - Ensure that the support surface is firm, level, and non-slippery - Set up at proper 4 to 1 pitch - Extend at least 3' above the landing - Secure in place, tie at top and/or brace at bottom - Consider and avoid contact with energized electrical conductors - Use non-conductive ladders around energized electrical conductors - Ensure rungs are free of ice, mud, and slippery substances - Maintain 3-point contact at all times while climbing - Stay off the top two rungs while climbing or working - Keep the belt buckle inside the ladder side rails to avoid reaching too far - Never carry tools, materials, or objects while climbing
Ladder (Stepladder)	- Fall - Contact with electrical conductor	- Inspect for defects - Ensure support surface is firm, level, and non-slippery - Consider and avoid contact with energized electrical conductors - Use non-conductive ladders around energized conductors - Ensure steps are free of ice, mud, and slippery substances - Never use stepladder as a straight ladder - Maintain 3-point contact at all times while climbing - Stay off the top two steps while climbing or working - Keep the belt buckle inside the ladder side rails to prevent reaching too far - Never carry tools, materials, or objects while climbing
Laser	- Eye damage	- Keep laser beam controlled and in a safe direction - Wear anti-laser eye protection - Consider and address reflected laser light

		▪ Consider and address the safety of other affected workers/trades
Lead	▪ Organ damage ▪ Nervous system problems ▪ Reproductive system problems	▪ Identify lead containing materials ▪ Establish and monitor exposure ▪ Provide adequate ventilation ▪ Use respiratory protection when needed ▪ Wear protective clothing ▪ Establish and use proper decontamination practices
Lifts (Articulating Boom – Electric)	▪ Fall ▪ Struck by ▪ Pinch point	▪ Inspect for defects ▪ Test controls ▪ Ensure the battery is charged ▪ Inform affected workers about lift operation pinch points ▪ Use a fall restraint system/full body harness ▪ Move the lift only in the fully down position ▪ Establish good housekeeping on platform decks ▪ Use the lift only on smooth, solid, level surfaces ▪ Maintain a clear view of the area being navigated
Lift (Boom Lift)	▪ Fall ▪ Struck by ▪ Carbon monoxide	▪ Inspect for defects ▪ Wear full body harness/fall restraint system ▪ Establish good housekeeping on platform decks ▪ Use the lift only on solid, level ground ▪ Determine/observe rated capacity ▪ Use only for positioning workers/tools/equipment ▪ Ensure that all tools and equipment fit within the basket ▪ Barricade the area under the lift ▪ Ensure a clear view of the work area for lift navigation ▪ Turn off gas powered lifts immediately after they are positioned inside the structure ▪ Provide adequate ventilation
Lifts (Scissors)	▪ Fall ▪ Struck by ▪ Pinch point	▪ Inspect for defects ▪ Test controls ▪ Inform affected workers about lift operation pinch points

		↳ Use a fall restraint system/full body harness ↳ Move the lift only in the fully down position ↳ Establish good housekeeping on platform decks ↳ Use the lift only on smooth, solid, level surfaces ↳ Use the lift only for positioning workers and small tools ↳ Barricade the area under the lift ↳ Prohibit the operator from running over cords, hoses, or welding leads ↳ Maintain a clear view of the area being navigated
Line of Fire	↳ Struck By ↳ Caught In or Between	↳ Communication ↳ Body Positioning ↳ Aware of surroundings ↳ Pinch points ↳ Correct tool ↳ Overhead loads ↳ LOTO ↳ Barricade ↳ Machine guards ↳ Walking working surface ↳ Make eye contact with equipment operator
Lockout/Tagout	↳	↳ Is there a LOTO procedure? ↳ Are all potential energy sources controlled and verified? ↳ Has it been double verified? Walk down- DOUBLE VERIFY! - have client perform lockout walk down with crew. ↳ Electrical- All power isolated and de-energized? ↳ Mechanical- all moving parts blocked and chalked? ↳ Air- Valves closed, lines bled? ↳ Thermal- Let cool down below 120° F before working. ↳ Hydraulic- Pumps off? Lines bled? ↳ Chemical- Are all lines drained and flushed? ↳ Block & bleed ↳ Are high point vents and low point drains utilized? ↳ PPE- Will respirators or other

		specialized PPE be needed. Are they qualified? - Training-Are all crew members LOTO trained? - Permits-Have all crew members signed the permit? - Have you applied your LOTO padlocks? Are all crew member's locks on the lockbox? - Have they removed & controlled their key?
LP Gas	- Fire - Respiratory - Sensitizer - Asphyxiant	- Review and observe the SDS - Inspect the cylinder for leaks - Ensure the excess flow valve is on the cylinder - Inspect valves, connectors, manifold valve assemblies, hoses, and regulators - Provide adequate ventilation - Remove flammable and combustible materials from the area - Keep a fire extinguisher nearby
Material Handling (Manual)	- Soft tissue – back, spine - Hernia - Shoulder - Laceration - Pinch point - Fall - Struck by	- Deliver materials as close to the work area as possible - Use lifting and moving equipment whenever possible - Wear safety glasses and gloves - Use proper lifting techniques - Make affected workers aware of pinch points and sharp edges - Stage materials at waist level - Establish good housekeeping in the work area - Ensure an adequate number of workers for lifting and carrying
Manganese	- Nervous system problems	- Review and observe the SDS - Provide adequate ventilation - Position workers to keep welding fumes away from the breathing zone - Use respiratory protection when needed
Pipe Stand	- Struck by	- Inspect for defects and structural integrity - Install locking washer and bolt - Use only on firm, level ground - Use only within the designated height - Establish the weight of the materials

		↳ Establish and observe the weight capacity of the stand ↳ Wear safety glasses and gloves ↳ Loosely secure pipe to the understructure/roustabout ↳ Use auxiliary pipe stands while moving the original stands ↳ Use wide base stands in place of tripod stands for pipe over 4" diameter
Plasma Cutting	↳ Electric shock ↳ Burn ↳ Welder's flash ↳ Fire	↳ Secure required permit ↳ Establish the proper voltage ↳ Inspect leads for defects ↳ Wear a welding helmet, welder's gloves, acceptable clothing, and ear plugs ↳ Use a #10 shaded lens at a minimum ↳ Maintain adequate ventilation in the work area ↳ Remove flammable and combustible materials from the work area ↳ Use fire blankets and/or welding screens to contain sparks ↳ Keep a fire extinguisher nearby ↳ Assign a fire watch for at least 30 minutes after cutting is complete
Pneumatic Testing	↳ Struck by object ↳ Object in eye	↳ Secure required permit ↳ Notify other affected trades about operation ↳ Wear safety glasses, a face shield, gloves, and proper clothing ↳ Barricade the work area ↳ Isolate the equipment ↳ Identify the operating pressure ↳ Ensure that all welds are free of insulation ↳ Visually inspect all pipe welds ↳ Inspect and calibrate all gauges ↳ Ensure that test gauges range from 1½ to 4 times test pressure ↳ Use a gauge at the pressure source ↳ Use a gauge at the highest or furthest point from the pressure source ↳ Use a pressure relief valve for tests of 100 psi or more/1-hour plus hold ↳ Isolate branch lines where applicable

		↳ Use blow down valves when branch lines are isolated ↳ Ensure blow down valves are installed in the proper location ↳ Ensure hoses are properly rated ↳ Keep hold times to a minimum, steady pressure and walk the line ↳ Increase test pressure in increments of 20% or less ↳ Ensure the gauge is stable before increasing pressure
Power Washer	↳ Laceration ↳ Eye damage ↳ Electric shock	↳ Inspect for defects ↳ Ensure that the plug's ground prong is in place ↳ Use GFCI ↳ Wear safety glasses, a face shield, rubber gloves, boots and a rain suit ↳ Review/observe SDS when chemicals are used ↳ Consider and monitor wind direction ↳ Properly set and monitor pressure
Powder Actuated Tools	↳ Puncture ↳ Eye damage	↳ Ensure that operator has specialized powder actuated tool training, and the appropriate license when required ↳ Inspect for defects ↳ Wear safety glasses, a face shield, gloves, and ear plugs ↳ Inform/alert others in the work area before firing ↳ Keep action pointed in a safe direction ↳ Select the most appropriate power setting ↳ Make the operator aware of the potential for ricochets ↳ Ensure that the operator knows not to move the tool for 30 seconds after a misfire
Propress	↳ Soft tissue – back, spine ↳ Hernia ↳ Electric shock ↳ Pinch point ↳ Laceration	↳ Inspect for defects ↳ Use proper lifting techniques ↳ Use proper work posture ↳ Consider and address pinch points ↳ Use GFCI ↳ Wear safety glasses, gloves, snug clothing
Pumps (Sewage Ditch Electric)	↳ Electric shock ↳ Struck by	↳ Inspect for defects ↳ Ensure that the plug's ground prong is in place

		▪ Use GFCI ▪ Wear safety glasses and gloves ▪ Lower pump by rope ▪ Ensure the area directly under the pump is vacant when lowering the pump ▪ Immediately disinfect a pump used on a sanitary system
Pumps (Sewage Ditch Gasoline)	▪ Struck by ▪ Carbon monoxide	▪ Inspect for defects ▪ Wear safety glasses and gloves ▪ Lower the pump by rope ▪ Ensure the area directly under the pump is vacant when lowering the pump ▪ Ensure ditch is properly ventilated and monitored ▪ Immediately disinfect a pump used on a sanitary system
Roof Top Work	▪ Fall ▪ Struck by object ▪ Electric shock	▪ Wear safety glasses, gloves, rubber boots, and fall protection equipment ▪ Tie off and secure the access ladder ▪ Establish fall prevention/protection ▪ Identify and address skylights, hatches, and other fall hazards ▪ Wear arc flash protective equipment when working on energized units ▪ Implement lockout/tagout when required ▪ Identify and address slip/trip hazards
Rigging (Chokers)	▪ Struck by object	▪ Calculate the weight of the load ▪ Select the proper size/load rating ▪ Ensure the load rating tag is attached and legible ▪ Inspect nylon for cuts, tears, and worn eyes and threads ▪ Inspect the cable for kinks, wickers, rusting, and deterioration ▪ Ensure shackles are properly sized and rated ▪ Inspect shackles for defects/original pins only ▪ Ensure shackle pins are not resting on the hook ▪ Arrange shackles to prevent side-loading ▪ Ensure the spreader bar is load rated and certified

		↓ Use softeners to protect chokers from sharp or angled edges ↓ Ensure softeners are properly sized
Rigging (Power Rigging- Hand Crabs)	↓ Struck by ↓ Crushed by ↓ Pinched	↓ Inspect for defects ↓ Inspect rigging equipment for proper function ↓ Ensure rigging equipment is properly sized ↓ Wear safety glasses, gloves, and protected toe boots ↓ Ensure proper attachment to the beam ↓ Ensure cable is tracking properly on the drum ↓ Ensure base is concrete anchored with a backup plate ↓ Ensure a stop is present on the beam ↓ Ensure the load line is free and clear ↓ Ensure snatch blocks are the proper size ↓ Consider and address the proper location of the snatch blocks ↓ Ensure adequate anchoring for sheaves ↓ Ensure the locking device is secured ↓ Notify other affected trades ↓ Barricade the hoist area ↓ Establish good housekeeping in the hoist area
Rigging (Power Rigging Pipe)	↓ Struck by ↓ Crushed by ↓ Pinched	↓ Evaluate the hoist area ↓ Ensure rigging equipment is properly sized ↓ Inspect rigging equipment for defects ↓ Notify other affected trades ↓ Barricade the hoist area ↓ Wear safety glasses, gloves, and protected toe boots ↓ Identify and address pinch points ↓ Establish good housekeeping in the hoist area ↓ Test load/ensure center of gravity is addressed
Rigging Sling (Alloy Steel Chain)	↓ Struck by object	↓ Inspect for defects ↓ Ensure identification tag is in place and legible ↓ Determine and observe the rated capacity

		↳ Ensure the correct type of sling is selected for the job
Rigging Sling (Natural – Synthetic Fiber)	↳ Struck by object	↳ Inspect for defects ↳ Ensure identification tag is in place and legible ↳ Determine and observe the rated capacity ↳ Ensure the correct type of sling is selected for the job ↳ Protect the sling from sharp edges and softeners
Rigging Sling (Synthetic Web)	↳ Struck by object	↳ Inspect for defects ↳ Ensure identification tag is in place and legible ↳ Determine and observe the rated capacity ↳ Ensure the correct type of sling is selected for the job ↳ Protect the sling from sharp edges and softeners
Rigging Sling (Wire Rope)	↳ Struck by object	↳ Inspect for defects ↳ Ensure identification tag is in place and legible ↳ Determine and observe the rated capacity ↳ Ensure the correct type of sling is selected for the job ↳ Protect the sling from sharp edges, corners, and softeners Ensure that each leg is secured at the hook ↳ Use a shackle with choker hitches
Sander (Bench)	↳ Abrasion ↳ Object in eye ↳ Electric shock ↳ Burn ↳ Fire	↳ Inspect for defects ↳ Ensure guards and shields are in place and properly positioned ↳ Ensure tool rests within 1/8” of the wheel surface ↳ Ensure back sweeps within 1/4” of the wheel surface ↳ Ensure adequate lighting ↳ Ensure that the plug’s ground prong is in place ↳ Use GFCI ↳ Ensure correct belt and disk are in place ↳ Ensure that the maximum RPM of the wheels is greater than or equal to the

		maximum RPM of the sander - Ensure belts and disks are tight - Ensure belts and disks are clean and in good condition - Wear safety glasses, a face shield, gloves, ear plugs, and snug clothing - Remove flammable and combustible materials from the work area - Keep a fire extinguisher nearby - Unplug the sander before making adjustments or changing belts and disks
Saw **(Chop Saw)**	- Laceration - Electric shock	- Inspect for defects - Ensure that the plug's ground prong is in place - Use the saw only in dry conditions - Protect the cord from cuts and insulation damage - Use GFCI - Ensure the guard is in place - Wear a face shield, gloves, safety glasses, and ear plugs - Select the proper blade - Replace worn blades immediately - Establish good housekeeping in the work area
Saw **(Circular Saw – Bench/Hand Held)**	- Laceration - Object in eye - Electric shock	- Inspect for defects - Select the proper blade for the material - Ensure blade RPM is correct for the saw - Ensure the guard is in place and properly adjusted - Adjust the blade to the proper depth - Leave base mounted saws on the base - Wear safety glasses, a face shield, gloves, and ear plugs - Remove flammable and combustible materials from the work area - Use GFCI - Secure material in place - Ensure the blade is free from material before starting the saw - Use two hands to operate the saw - Consider and monitor the position of the power cord while cutting - Unplug the saw before changing the

		blade or servicing it
Saw **(Porta Band Saw)**	↓ Laceration ↓ Object in eye ↓ Electric shock	↓ Inspect for defects ↓ Ensure guards are in place ↓ Use GFCI ↓ Wear safety glasses, gloves, and ear plugs ↓ Use two hands to operate the saw ↓ Establish good housekeeping in the work area ↓ Secure material in place before cutting ↓ Position yourself to use the saw safely ↓ Keep feet and hands clear of operation ↓ Unplug before maintaining the saw or changing the blade
Saw (Cut Off)	↓ Laceration ↓ Object in eye ↓ Electric shock ↓ Burns	↓ Inspect for defects ↓ Secure the saw and base ↓ Ensure guards are properly placed ↓ Set the proper cutting depth ↓ Use GFCI ↓ Wear safety glasses, gloves, ear plugs, and snug clothing ↓ Ensure adequate ventilation ↓ Ensure good housekeeping in the work area ↓ Consider the extension cord's location before cutting ↓ Unplug before changing the blade or performing maintenance
Saw **(PDQ Saw – Electric)**	↓ Laceration ↓ Electric shock	↓ Inspect for defects ↓ Wear safety glasses, a face shield, ear plugs, and snug clothing ↓ Establish good housekeeping in the work area ↓ Use GFCI ↓ Ensure the blade is in good condition
Saw **(PDQ Saw – Gas)**	↓ Laceration ↓ Fire	↓ Inspect for defects ↓ Wear safety glasses, a face shield, ear plugs, and snug clothing ↓ Establish good housekeeping in the work area ↓ Keep a fire extinguisher nearby ↓ Store gas at least 25' from the saw and work area ↓ Provide adequate ventilation in the work area/control fumes ↓ Ensure the blade is in good condition

Sawzall	✚ Laceration ✚ Object in eye ✚ Electric shock	✚ Inspect for defects ✚ Ensure guards are in place ✚ Use GFCI ✚ Wear safety glasses, gloves, and ear plugs ✚ Ensure the blade is properly inserted and locked in place ✚ Use two hands used to operate the saw ✚ Establish good housekeeping in the work area ✚ Properly secure the material being cut ✚ Position the operator to safely use the saw ✚ Keep feet and hands clear of operation ✚ Use the safety lock when not cutting ✚ Disconnect from the power source before performing maintenance or blade changes ✚ Check head room
Scaffold (Mobile)	✚ Fall from scaffold ✚ Fall with scaffold	✚ Establish/designate a competent person to oversee erection and dismantling ✚ Perform a daily inspection ✚ Inspect for defects, incompatible parts, and improper erection ✚ Ensure the scaffold will support at least 4 times the intended load ✚ Use only on solid, level ground ✚ Use top rails, mid rails, and toe boards when the work platform is 10’ or higher ✚ Ensure the scaffold it properly tagged ✚ Establish good housekeeping on work platforms ✚ Inspect the ground for holes, cracks, debris, and encumbrances ✚ Ensure wheels are locked before climbing ✚ Never move a scaffold with anyone onboard
Scaffold (Supported)	✚ Fall from scaffold ✚ Fall with scaffold	✚ Establish/designate a competent person to oversee erection and dismantling ✚ Perform a daily inspection ✚ Ensure the scaffold is erected at least

		10’ from power lines - Inspect for defects, incompatible parts, and improper erection - Ensure the scaffold will support at least 4 times the intended load - Erect only on firm ground - Erect on base plates, mud sills, or other firm foundations - Use top rails, mid rails, and toe boards when the work platform is 10’ or higher - Ensure the scaffold is properly tagged - Establish good housekeeping on work platforms - Ensure a ladder or other proper scaffold access is in place - Tie to a structure when the height is more than 4 times the width of the base - Ensure the scaffold is never overloaded - Training- Are all users trained? - Fall protection- Needed when climbing 10 feet or more. - Falling objects- Barricade, nets, canopies, and toe boards. - Electrical Lines - stay at least 10 feet or more away. - Planking- 1” gap MAX between planks. - AREA X DUTY= MAX LOAD - Inspections- Inspected before each shift? - Condition- Fall protection needed for yellow tagged? - Access ladder/gates- are these present? - Housekeeping- Working surface clear of debris - 14” Rule- Fall protection needed if leading edge more than 14” away from scaffold edge
Silica	- Silicosis - Suspect carcinogen	- Provide adequate ventilation - Use dust collection cups with masonry drill bits - Use wet method or vacuum with HEPA filter when cutting concrete - Use respiratory protection when

		needed
Smoke Machine	↓ Respiratory sensitization ↓ Eye irritation ↓ Fire	↓ Review and observe SDS ↓ Provide adequate ventilation ↓ Wear safety glasses, gloves, and proper clothing ↓ Determine and set proper pressure level ↓ Establish emergency exits ↓ Keep a fire extinguisher nearby
Soldering (Silver Soldering)	↓ Burn ↓ Fire ↓ Respiratory sensitization	↓ Secure required permit ↓ Remove flammable and combustible materials ↓ Ensure adequate ventilation ↓ Keep a fire extinguisher nearby ↓ Wear safety glasses, gloves, and proper clothing ↓ Identify and isolate the contents of area pipelines ↓ Complete required purging ↓ Implement lockout/tagout where required ↓ Secure oxygen and acetylene cylinders in the upright position ↓ Secure B-tanks in the upright position ↓ Turn off gas cylinders and tanks when leaving the area ↓ Assign fire watch for at least 30 minutes after operation is complete ↓ Shut down and cap oxygen and acetylene cylinders when work is completed
Solvents	↓ Fire ↓ Skin irritant ↓ Central nervous system ↓ Depression	↓ Review and observe SDS ↓ Provide adequate ventilation ↓ Wear splash proof goggles, a face shield, and impermeable gloves and clothing ↓ Close containers when not in use ↓ Isolate from ignition sources ↓ Keep a fire extinguisher nearby ↓ Ensure containers are properly labeled
Stair Walker	↓ Struck by ↓ Pinched	↓ Inspect for defects ↓ Wear safety glasses and gloves ↓ Barricade the stairwell ↓ Ensure tires are properly inflated ↓ Ensure battery is charged ↓ Secure straps ↓ Ensure that affected workers receive the

		proper training - Ensure affected workers are above the load - Inform affected workers about pinch points - Assign at least two workers to the task
Stored Energy	- Electric shock - Struck by object - Object in eye	- Identify stored energy - Turn off, block, and isolate sources of energy - Release/relieve stored energy - Lock out the source of energy - Ensure the worker who locked out is the only one who can remove the lock, keys controlled
T-Puller	- Struck by object - Electric shock - Object in eye	- Inspect for defects - Wear safety glasses, gloves, and snug clothing - Use GFCI
Tools (Hand Tools)	- Laceration - Puncture - Broken bone - Gouge - Struck by object	- Inspect for defects - Ensure handle is tight - Wear safety glasses, gloves, and protected toe boots - Ensure the tool is clean, dry, and non-slippery - Ensure cutting tools are sharp
Torch Cutting	- Burn - Fire - Explosion	- Secure required permit - Remove flammable and combustible materials - Keep a fire extinguisher nearby - Ensure the work area is properly ventilated - Secure gas cylinders in the upright position - Inspect valves, gauges, hoses, and torch for defects - Ensure gauges are equipped with reverse flow check valves - Keep hoses and gauges away from oil - Wear cutting goggles, gloves, a face shield, and appropriate clothing - Equip cutting goggles with #5 shaded lenses or face shield with #5 shaded lens - Cap and properly store cylinders when not in use - Only use a striker to ignite the torch - Assign a fire watch for at least 30

		minutes after cutting is complete
Walker/Stacker	Struck by Crushed by Pinched	Inspect for defects Ensure the fork length is considered and adequate Wear safety glasses, gloves, and protected toe boots Ensure the travel path is clear Ensure ramps are gradual enough to keep wheels on the ground Ensure the load is secure and balanced Keep the load low during travel Use a ratchet binding strap or equivalent when raising the load
Welding (Electric Arc)	Electric shock Burn Fire Respiratory sensitization Welder's flash	Secure required permits Inspect for defects Wear a helmet, safety glasses, welding gloves and clothing, and boots Ensure the proper shade of lens is used Provide adequate ventilation Use respiratory protection when required Use the proper size extension cord Inspect the extension cord for defects Inspect leads for defects Ensure welding screens are in place Barricade the work area Remove flammable and combustible materials from the work area Keep a fire extinguisher nearby Position affected workers to keep fumes from the breathing zone Turn off the machine before fueling Use a metal bucket for discarding electrodes Keep a fire extinguisher nearby Assign a fire watch for at least 30 minutes after cutting is complete
Welding (Orbital)	Electric shock Burn Fire Respiratory sensitization	Secure required permit Inspect for defects Ensure gas connections are snug and check for leaks Wear safety glasses and gloves Review and observe material SDS Provide adequate ventilation Use GFCI Keep a fire extinguisher nearby

Welding (Tig)	↓ Electric shock ↓ Burn ↓ Fire ↓ Respiratory sensitization ↓ Welder's flash	↓ Secure required permits ↓ Inspect for defects ↓ Ensure gas connections are snug ↓ Wear helmet, safety glasses, welding gloves and clothing, and boots ↓ Ensure that the proper shade of lens is used ↓ Provide adequate ventilation ↓ Ensure and monitor adequate oxygen/breathing air supply ↓ Use respiratory protection when required ↓ Inspect leads for defects ↓ Ensure guards on stinger are in place ↓ Ensure welding screens are in place ↓ Barricade the work area ↓ Remove flammable and combustible materials from the work area ↓ Keep a fire extinguisher nearby ↓ Ground the clamp as close to the work area as possible ↓ Remain insulated from electrical current ↓ Position the worker to keep fumes away from the breathing zone ↓ Stand to one side of the flow meter when charging the bottle
Zinc	↓ Respiratory sensitization ↓ Zinc fume fever	↓ Provide adequate ventilation ↓ Position worker to keep fumes away from the breathing zone ↓ Use respiratory protection when needed

HAZARDS AND ELIMINATIONS FROM PAST WINGER PJHAs

Job List	List Hazards			Eliminate or Control Hazards
General Work Tasks	Back Strains	FROM	lifting materials, tools, equipment	Ask for help, use chain falls and/or other lifting equipment designed to do the job, daily stretches.
	Body or hand injury	FROM	bending pipe	Be aware of body and hand placement, use buddy system for long pieces of pipe.

	Body or hand injury	FROM	rotating equipment	PPE, positioning, no loose clothing, get covers replaced if applicable.
	Body or hand injury	FROM	unexpected release from equipment or tools	Watch body and hand placement. Stay focused. Be aware of surroundings.
	Burns to exposed skin	FROM	hot process pipes	Be aware of surroundings and body placement, use welding blanket if necessary. Wear long sleeved shirt or welder's sleeves.
	Chemical burns, poisoning	FROM	chemicals in plant	Know the contents of the pipe / equipment you are working on, use MSDS'S, check with operations.
	Contusions	FROM	falling objects, tools, parts, etc.	Wear hard hat, secure material & tools, and communicate with others in area.
	Crushing	FROM	driving into or over someone or something	Eyes on path, use spotter for backing up.
	Crushing	FROM	heavy pipe, equipment	Eyes on task, body positioning, use buddy system.
	Crushing injury	FROM	operating lift in tight spaces	Watch lift placement, body placement and others in area.
	Cuts to hands & arms	FROM	sharp edges on steel, struts, wire, and pipe	Wear cut resistant gloves, inspect & file sharp edges.
	Electrical Arc Flash	FROM	Installing MCC Buckets in MCC	Flash Protection Suit / Qualified Personnel
	Electrical Hazard to Others	FROM	Arc flash	Barricade boundary / Communication
	Electrical Shock	FROM	electrical powered equipment, MCC	Make sure equipment is grounded, use GFCI. Follow LOTO procedures.
	Electrical Shock	FROM	energized equipment.	Double verify that electrical circuits are safe to proceed with job task. Follow LOTO procedures.
	Electrical Shock	FROM	installing equipment	LOTO, Proper PPE, only **Qualified** personnel, use GFCI outlets.
	Explosion	FROM	hazard in restricted area	Follow ignition source & permit procedures.
	Eye Injury	FROM	flying debris, dust in area, chemical splash, use proper	Wear safety glasses, goggles when necessary

			procedure when removing eye protection	
	Falling Objects	FROM	overhead objects/workers	Communicate with others in area, secure materials and tools.
	Falling Objects	FROM	improper or damaged rigging	Use proper rigging techniques, inspect rigging equipment for fraying, etc.
	Falls from elevated work	FROM	not using correct equipment for elevated work	Use correct equipment for the job. Wear fall protection. Maintain 3-points of contact. Use proper anchor points. Hoist tools up to working level.
	Falls	FROM	incorrect ladder position	Set up ladder correctly, tie-off ladder. Use 100% fall protection if above 3rd step.
	Frostbite / Wind burn	FROM	cold weather	Wear layers, cover exposed skin, take breaks, watch co-worker for signs of frostbite.
	Hand Injury	FROM	pinch points, crushing	Wear gloves, be aware of body positioning,
	Hazards to & from others	FROM	other co-workers, people in same area	Communication with others. Be aware of your surroundings. Tape off area to warn others.
	Hazardous vapors	FROM	spills, leaks or contents of equipment	Test air with monitor, proper ventilation, confined space procedures if applicable.
	Head Injuries	FROM	overhead pipe and/or equipment	Wear hardhat, be aware of body positioning, eyes on path.
	Hearing Loss	FROM	loud noise from running equipment, tools and plant operations.	Wear hearing protection.
	Heat Stress	FROM	extreme temperatures, dehydration	Make sure water intake is sufficient, take electrolyte tablets if needed, take frequent breaks and/or rotate personnel. Watch others for heat symptoms.
	Heat Stress	FROM	wearing Arc Flash suit	Work-Rest Regimen / Rotate Workers.
	Injury - Cuts, bruises, abrasions to	FROM	carrying materials, tools or equipment - swing hazard	Line of fire, team work, watch for others in your area.

	body			
	Line of fire	FROM	draining pipe or equipment	Slowly release pressure. Ensure body position is safe.
	Muscle Strain	FROM	lifting heavy object	Use correct lifting techniques, buddy system, use mechanical means when applicable (chain falls, pipe carts, etc.)
	Objects in eyes or skin	FROM	metal shavings from threading pipe	Wear gloves and safety glasses.
	Others getting hurt	FROM	lack of communication, poor planning.	Communicate with others, staging work. Use caution and danger tape when needed. Always watch out for the other guy.
	Pinch Points	FROM	maneuvering equipment or heavy pipe	Use chain falls, good lifting techniques, team work, be aware of surroundings, eyes on task.
	Pinch Points	FROM	attaching conduit to anchors / hangers	Wear gloves, keep eyes on task
	Pinch Points	FROM	ladders, tools, equipment	Think about how you are about to use your tools. Use good body positioning.
	Pinch Points	FROM	tight work area	Be aware of body position.
	Restricted Area	FROM	solvents in area	No cell, pager, lighter. Use brass tools. Only trained personnel are authorized in area.
	Slips, Trips, Falls	FROM	wet and/or slippery surfaces	Clean area. Wear proper boots w/non-slip soles. Be aware of wet surfaces or leaking equipment. Choose alternate route if possible. Use handrails where provided.
	Slips, Trips, Falls	FROM	wire, tools on floor	Try to keep wire out of walkway. Barricade area from others. Keep tools organized. Clean area when done working.
	Slips	FROM	tools	Use correct tool for task, be aware of line of fire for your hand, body and others around you.
	Strains, sprains, muscle spasms	FROM	repetitive motion	Daily stretches, use good body mechanics, change work positions, switch tasks w/co-worker.

	Strains	FROM	pulling wire	Watch body position, good teamwork, use good lifting practices, and carry smaller loads.
	Twist or sprain wrist	FROM	straining to fasten or loosen something	Keep control of tools, use correct tool for task, use lubricating oil or heat to loosen resistant bolts
	Trips/Falls	FROM	hoses, cords, welding leads, materials and tools stored improperly, uneven working surfaces	Organize tools and materials in **work piles** out of walkways. String electrical cords and welding leads overhead when possible.

NOTE: When you are waiting for permits, co-workers, conditions, etc. THINK about how you are going to perform your work SAFELY! Do you have all of your tools? Do you have all the parts you will need? Clean up and/or organize work area, truck or van. Is there anything you can do to make your job task safer, easier and more efficient?

SOURCE CREDITS

U.S. Department of Labor, Occupational Safety and Health Administration, www.osha.gov
Mechanical Contractors Association of America, www.mcaa.org
U.S. Department of Health and Human Services, CDC, NIOSH www.cdc.gov/niosh

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