

TITANIUM



EXCAVATION,LLC

Corporate Safety Program

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TITANIUM EXCAVATION

SAFETY AND LOSS PREVENTION PROGRAM

POLICY STATEMENT

It is Titanium Excavation’s policy to provide and maintain a safe and healthy work environment for all its personnel.

To achieve this goal, every reasonable effort shall be made to utilize the principles of accident and loss prevention in the management of all activities and programs.

Specifically, it is our management’s responsibility to identify, control and/or eliminate known hazards which can result in personal injury or illness, property damage, fire, breach of security, negative environmental impact or any other form of controllable loss.

All personnel are ultimately responsible for their own safety by complying with legislative, company and industry standards, as well as by promptly reporting all unsafe acts or conditions to supervisors. Supervisors are responsible for taking immediate action to solve such problems.

The success of our safety and loss prevention program requires the dedication, commitment, involvement and participation of all personnel working together to achieve this common goal.

Signature of Steve Vandermeer (Owner):



TITANIUM EXCAVATION

SAFETY PHILOSOPHY

DEMONSTRATING LEADERSHIP

Titanium Excavation is committed to providing a safe and healthy work environment for all personnel.

OUR GOAL IS ZERO ACCIDENTS

Safety is an integral part of Titanium Excavation's operation. Our company is committed to the goal of **zero accidents** on all projects. No work is so important that it cannot be done safely.

RESPONSIBILITY AND AWARENESS

To ensure that our goal of **zero accidents** is achieved, the following assignments of responsibility have been established:

Management

1. Establish rules and programs designed to promote safety and make known to all employees the established rules and programs.
2. Provide to all project superintendents the necessary resources enabling them to comply with applicable Safety and Health Standards as well as company policy.
3. Provide appropriate personal protective equipment for employees where required.



4. Be responsible for employee and supervisor training on specific safety and health issues, as well as safe job procedures.
5. Impress upon all the responsibility and accountability of each individual to maintain a safe work place.
6. Establish and implement procedures for investigating occupational accidents, injuries, illnesses, and “near miss” incidents.
7. Establish, implement, review and confirm that proper methods and procedures have been taken for correcting unsafe and unhealthy conditions and work practices.
8. Discipline any employee disregarding safety policies and procedures.
9. Require all subcontractors as a matter of contract, and all material suppliers through purchase order terms, to follow safety rules.
10. Conduct scheduled and unscheduled safety inspections of all company job sites, maintain records, and continually monitor the programs effectiveness.
11. Take action to correct unsatisfactory safety performance.

Project Supervisor

1. Plan production so that all work will be done in compliance with established safety and health regulations.
2. Be completely responsible for continually monitoring (through daily personal observations and weekly hazard assessments) the job-site for hazards or unsafe working conditions and ensuring that all safety deficiencies are corrected.
3. Make sure proper safety materials and protective devices are available and used and all equipment is in safe working order.



4. Instruct foreman/crew leaders of all project safety and health requirements.
5. Direct foremen/crew leaders to take prompt corrective action to stop unsafe acts and eliminate unsafe or unhealthy conditions.
6. Ensure that all new employees are orientated on the hazards associated with their job, company safety and health policies, and provide employees with proper job instruction on how to perform their tasks safely by following specific job procedures.
7. Conduct initial and weekly job-site hazard assessments, as well as employee job safety observations.
8. Conduct job-site safety meetings.
9. Investigate accidents and reviewing reports for accuracy. Take corrective action to prevent recurrence.
10. Require conformance to safety standards from subcontractors.
11. Document and notify company office of all safety violations and what corrective measures have been taken; discipline employees who do not comply with safety rules, procedures and policies.
12. Verify that all on-site company vehicles and equipment are maintained within safe operating conditions and specify that all equipment is inspected daily before use.
13. Know the emergency procedures and advise employees about them.
14. Provide protection to the public with regards to company operations.
15. Attempt to ensure safe performance by others present on the job site, including owner and architect/engineer representatives, the general public, visitors, and the employees of other contractors.



Job Foremen/Crew Leaders

1. Carry out safety policies and procedures at the work level.
2. Be aware of all safety and health requirements and safe work practices.
3. Plan all work activities to comply with safe working practices.
4. Assist project superintendents in new employee orientation involving safe job procedures, job-site hazard assessments, and employee job safety observations.
5. Install and maintain devices to protect the public from company operations.
6. Make sure proper personal protective equipment is available and used by all employees; ensure that tools, equipment and protective devices are properly maintained and utilized.
7. Make sure work is performed in a safe manner and no unsafe conditions or equipment are present.
8. Develop and maintain good housekeeping standards.
9. Conduct a preliminary investigation upon report of incident/accident.
10. Correct all hazards, including unsafe acts and conditions which are with in the scope of your position.
11. Secure prompt medical attention for any injured employees.
12. Report all injuries and safety violations to project superintendent.
13. Set a good example.



Workers/Employees

1. Each employee shall be held responsible for performing his/her work in a safe manner.
2. Employees shall comply with all requirements outlined in Titanium Excavation's Safety and Health Program.
3. All accidents/incidents, personal or otherwise, no matter how minor, shall be reported immediately to the employee's immediate supervisor.
4. All employees shall be ready at all times without fear of reprisal, to correct unsafe conditions or to report hazards at the job-site to their supervisors or management directly.
5. All employees shall cooperate with or participate in, accident/incident investigations.
6. All employees shall comply with all safe work procedures.
7. All employees shall participate in safety orientations, weekly safety meetings and other safety-related gatherings.
8. All employees shall maintain good housekeeping in the work area.
9. All employees shall refuse to work if personal safety is compromised.
10. All employees shall wear adequate and proper personal protective equipment.
11. All employees shall set a good example.



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EMPLOYEE DISCIPLINARY PROCEDURES

Progressive Disciplinary Program Safety Policy

Any employee who, in the judgment of management, knowingly commits an unsafe act or creates an unsafe condition, disregards this safety policy, or is a repeated safety or health offender, will be subject to disciplinary actions up to and including discharge (*see Employee Notice of Safety Violation in the Appendices*). For non-serious violations, the following procedures will be carried out:

- 1st violation will result in oral warning with documentation
- 2nd repeat violation will result in written warning
- 3rd repeat violation will result in termination

NOTE: A non-serious violation is one which the result of the same does not or would not have caused potential harm or damage to the affect employee, co-workers, company products or facility.

Grounds for Immediate Termination

- Any incident, whether or not an injury was sustained, that occurs as a direct result of negligence or poor decision making by the employee that could have, would have, or did lead to serious harm or damage to the affected employee, co-worker(s), or company products and/or facility.
- Any company safety policy violation that is not adhered to that could lead to serious harm or damage to the employee, co-worker(s), company products and/or facility.
- Any employee who purposely and/or knowingly disregards safety instructions from a supervisor.



- Failure to wear required personal protective equipment (PPE) for a specified job task when the employee has been instructed through training to do so.
- Failure to rectify or notify supervisor of hazardous situations.
- Failure to replace handrails, barriers, covers or protective devices including safety signs.
- Engaging in dangerous horseplay.
- Possession or being under the influence of illegal drugs or alcohol on the job-site location.
- Possessing firearms and/or other weapons on the job-site.
- Fighting.
- Theft or damage to property.
- Insubordination.
- Failure to use sanitary facilities provided.
- Vandalism.
- Use of personal radios or walkmans.
- Tampering with fire equipment and/or safety devices on tools and/or equipment.



TITANIUM EXCAVATION

GENERAL SAFETY RULES

Attitude

All Titanium Excavation employees are required to treat safety as a **#1 priority**. As such, they are expected to report to work in good mental and physical condition to safely perform their assigned duties. Before performing any tasks, employees must consider the possible affects of their actions on themselves and others and take appropriate protective measures.

General Job Safety Rules and Regulations

General:

1. All employees shall report all injuries, no matter how slight, to your supervisor at once. No excuse will be accepted for failure to comply with this order.
2. No person shall report to work while under the influence of alcoholic substances or illegal narcotic substances. Anyone involved in these activities will be immediately terminated.
3. Report hazardous conditions (unsafe floors, materials, etc.) promptly to project superintendent or job foreman/crew leader so that corrective actions can be taken.
4. Observe all Hazard Warning and No Smoking signs.
5. Keep aisles, walkways and working areas clear of slipping and tripping hazards.
6. Know the location of fire/safety exits and evacuation procedures.



7. Keep all emergency equipment such as fire extinguishers clear of obstacles.
8. Refrain from horseplay, fighting, or distracting fellow workers.
9. Operate only equipment and power tools for which you are authorized and properly trained for and observe safe operating procedures.
10. Follow proper lifting procedures at all times.
11. Be alert to see that all guards and other protective devices are in place and functioning properly **before** operating equipment. **DO NOT** remove guards or alter equipment in any way.
12. Frayed, torn or loose clothing, jewelry or long unrestrained hair is prohibited near moving machinery or other sources of entanglement (hand tools) or around electrical equipment.
13. Work at a speed consistent with safety.

Housekeeping:

1. Good housekeeping must be maintained at all times.
2. Ensure proper disposal of all personal items (lunch boxes, bottles, etc.).
3. Always store materials in a safe manner. Always tie down or support piled material to prevent falling, rolling or shifting.
4. Remove, cut off, or hammer down protruding nails, staples, etc. on all scrap wood.



Fire Prevention:

1. Store oxygen, acetylene and LP gas cylinders in racks away from other sources of heat or ignition. Store upright with caps in place.
2. Clean up fuel and oil spillage immediately. Dispose of oily rags and other combustible waste in non-combustible containers.
3. Store flammable liquids in cool, well-ventilated areas away from corrosives, oxidizers and ignition sources.
4. Flammable liquids shall be used only in small amounts at the job location and in approved safety cans.
5. Do not use gasoline to clean parts or to start fires.
6. Smoking shall be prohibited at or in the vicinity of operations which constitute a fire hazard.
7. Ground and bond flammable liquid containers to prevent static charge build-up.
8. Fire extinguishers shall be located strategically throughout the job-site, prominently marked for any detection and comply with local regulatory codes. Become familiar with these locations and fire extinguisher use.



Personal Work Rules:

1. Horseplay, fighting, gambling, possessions of firearms and possession or use of an alcoholic beverage or drugs, except those as prescribed by a qualified physician, are strictly forbidden.
2. Running is strictly prohibited, except in extreme emergencies.
3. Wear clothing suitable for the weather and your work. Torn, loose clothing, cuffs, sleeves, etc. are hazardous and could cause accidents.
4. Jewelry (rings, bracelets, neck chains, etc.) should not be worn.
5. Hard hats must be worn in all required areas.
6. Proper eye protection must be worn to protect eyes from flying objects/particles, dust, harmful rays, chemicals, etc.
7. Proper footwear must be worn. Safety boots are required. The wearing of sport shoes, sandals, dress shoes and similar footwear is strictly prohibited.



Compressed Gas Cylinders:

1. Put valve protection caps in place before compressed gas cylinders are transported, moved, or stored. Cylinder valves will be closed when work is finished and when cylinders are empty or being moved.
2. Compressed gas cylinders will be secured in an upright position at all times. Keep cylinder at a safe distance or shield from cutting or welding operations. Place where they cannot become part of an electrical current.
3. Oxygen and acetylene must not be stored together.
4. Oxygen and fuel regulators must be in proper working order while in use. Hoses must be inspected for damage or defects prior to use.
5. Where cylinders are stored in the open should be protected from accumulation of ice and snow and continuous direct rays from the sun and locations where high temperatures prevail.
6. When stored inside, cylinders must be in a well-ventilated area away from ignition sources and combustible materials.



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HAZARD ASSESSMENT

A Job Hazard Analysis is a means of identifying unsafe conditions that exist on a job-site. Many different regulations require a Job Hazard Analysis to be done. Some regulations call it a Hazard Analysis; some call it a Hazard Assessment. This is a written plan containing detailed hazard information that may be part of several regulatory compliance programs. Titanium Excavation project supervisors will be responsible for performing regular Job Hazard Analysis's during the initial phase of a project, and on a weekly basis. This assessment is the best way to review hazards in the workplace and protect employees from those hazards. Information resulting from the Job Hazard Analysis will be utilized to correct problems or potential problems to ensure a safe working environment for Titanium Excavation employees, as well as other job-site subcontractors and/or employees.

Job foreman/crew leaders, through training, study, and vigilance, will assist project superintendents in evaluating various areas of the job-site for unsafe conditions, and take it upon themselves to make it a part of their daily routine to recognize potential hazards and effectively recommend corrective measures.

Refer to Job Hazard Analysis in the Appendix



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EMPLOYEE JOB SAFETY OBSERVATION

Employee job safety observation is a process by which employees are periodically observed to determine their level of safety awareness and attitude with respect to following company safety rules and policies in addition to safe job procedures. It is a valuable tool in accessing employee job performance and the effectiveness of orientation and job-specific training. Job safety observations will be performed by the job foreman or site supervisor when an employee initially begins work with Titanium Excavation and periodically throughout the duration of their employment.



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ACCIDENT/INCIDENT INVESTIGATION POLICY & PROCEDURES

The objective of accident/incident reporting is to try and determine the cause(s) through examination, observation and inquiry and to implement suitable measures to prevent recurrence (*refer to Accident/Incident Investigation Form*).

It is also important to investigate “near misses” because they are warnings that aid in identifying problems and patterns that can lead to more serious accidents. By following through on the causes on “near misses” we can make changes or corrections that will prevent injuries, illnesses or damage to equipment. The removal of just a single cause can prevent reoccurrence. Complete investigation of all incidents is one of our best safety tools of preventing future injuries.

Reporting Procedure

A. Employee Responsibility

When any accident, “near miss” injury, or job-related illness occurs, it must be **promptly** reported to job foreman and/or project superintendent for evaluation and investigation. Employees must cooperate with all investigations of any accident in which they were involved, which was witnessed, or where their knowledge of the situation or procedure could be helpful.

B. Employer Responsibility

All accident/injury investigations should be conducted immediately by the project superintendent before the accident scene has been changed or altered and while the experience is still clear in the minds of witnesses. The information must be documented along with the appropriate corrective measures.



OSHA requires employers to record all occupational injuries and illnesses on the OSHA 300 log. The types of accidents and illnesses that must be recorded include: fatalities, lost workday cases, restricted duty cases, injuries requiring medical treatment only, and some first aid type injuries.

By law, a fatality or catastrophe must be reported to OSHA within 8 hours. A serious injury (hospital admission with medical treatment) must be reported within 24 hours.

NOTE: Any equipment involved in an accident resulting in a fatality is not to be moved until an OSHA representative investigates the accident and authorizes its removal. However, if it is necessary to move the equipment to prevent further accidents or to remove the victim, equipment may be moved as required.

The investigator will complete any company-related “Accident Investigation Form” with the purpose of determining the following:

1. Who and what was indirectly involved in the accident.
2. Where and when the accident occurred.
3. What tools, machines/equipment, condition of the building or job-site may have contributed to the accident.
4. What employee involvement or action(s) contributed to the incident?
5. Suggested steps/procedures to prevent reoccurrence.

The project superintendent will ensure that the following is done:

1. Photograph and detail the accident scene, documenting the extent of the serious injury, death or property loss.
2. Develop a plan to prevent the same accident from reoccurring.
3. Follow up and document the corrective action(s).



TITANIUM EXCAVATION

EMERGENCY ACTION PLAN

The primary objective of the Emergency Response Plan is to minimize injuries and damage, provide assistance to injured personnel and to emphasize the importance of fast response in an emergency.

Responsibilities:

Employees

All employees are expected to participate in and follow emergency response procedures and must be trained in safe evacuation procedure. Titanium Excavation will review with each employee upon initial hire, the parts of the Emergency Response Plan the employees must know to protect themselves in the event of an emergency. Employees must know location of first aid kits available, location of emergency evacuation plan with phone numbers, equipment and resources on the project, fire extinguishers, and meeting points.

Project Supervisor

During implementation of the Emergency Evacuation Plan, Titanium Excavation project supervisors will inform personnel of responsibilities regarding the plan as it pertains to the job-site. The project supervisors will develop designated meeting points and ensure the safety of all personnel is maintained by means of work stoppage, evacuation, worker head counts, maintenance of site security, etc. During an emergency the project supervisor is responsible for providing suitable resources to handle the situation (extra personnel, specialty personnel or agencies, equipment, etc.), handle media relations and ensure victims' families are notified.



Protection against Hazards:

Employees are to be informed of the plan's purpose, emergency escape procedures and route assignments. The following sequence of events will help employees respond quickly and properly in case of an emergency:

1. Call immediately for medical attention. Explain what kind of injury and where the victim is, to the project superintendent. Emergency numbers are posted for the nearest medical facility, paramedics and employees with first aid training.
2. Check to see if employee is breathing; do not move employees unless they are in imminent danger; make sure proper first air procedures are carried out.
3. Confirm site access is controlled.
4. Verify assistance is provided to emergency response personnel.
5. Before leaving the area, check rooms or other enclosed spaces for employees who may be trapped or otherwise unable to evacuate the area.
6. Work to resume when emergency resides.

First Aid Procedures:

Each type of emergency has its own first aid procedures. Titanium Excavation shall assure that there is a designated trained first aid provider on all jobsites

Bleeding: Put on latex gloves and stop the flow of blood until help arrives. To do this, push on the wound with a cloth or your hand. For deep cuts, elevate the wound while you apply pressure. For even more serious cuts, add a third action – push on pressure points on the inside of upper arm and crease of the groin. Do not use a tourniquet unless the bleeding will not stop.



Shock: A seriously injured person will frequently go into shock – which can be fatal. While you are waiting for medical help to arrive, lay the person down, cover, and raise the feet above the heart level. Do not provide anything to drink and check regularly for breathing.

Broken bones: Do not move a person who may have broken bones unless it is absolutely necessary. The wrong move could be deadly. Keep the person still and wait for professional help.

Eye injuries: Eye injuries should be treated immediately. If something is stuck in the eye, keep the person calm until medical help arrives. If chemicals were splashed in the eye, flush with water for at least 15 minutes. Then close the eyes, cover with a clean cloth and get medical help.

Electrical shock: Electrical shock can be deadly to the employee. It can also kill you if you make the wrong moves when you try to help. Do not touch the person in contact with a live electric current. Turn off main electric switch or fuse, or get an electrician or maintenance person to do it if one can be found quickly. If you *must* move a person from a live wire, stand on something dry and use a dry stick or board to push the person off the wire. Do not use anything metal, wet or damp. After the person has been moved from the electricity, check for heartbeat and breathing. If necessary and you are qualified, administer artificial respiration or CPR.

Burns: The way you treat a burn depends on the kind of degree burn it is.

1. *Chemical burns* – flush burned part of skin with water for 15 minutes; carefully remove contaminated clothing.
2. *First degree burn (least serious – skin is red), Second degree burn (skin is red and there are blisters); Third degree burn (most serious – skin is destroyed, tissues are damaged and there is charring)*
 - a. Wrap a person who is on fire in a blanket or coat, make the victim drop and roll.
 - b. Cut away loose clothing but do not touch clothing that is stuck to a burn.
 - c. DO NOT rub the body.

- d. Immerse first and second degree burns in cold water to relieve the pain, and then cover the skin with a moist sterile dressing. Elevate burned limbs.
- e. Treat the victim for shock and check for breathing problems.
- f. Do not use ice, lotion or ointment on a burn.

Chemical exposure: If someone has inhaled, swallowed or been splashed with a hazardous chemical, refer to the chemical's label and MSDS to determine proper treatment. There are, however, some general approaches that apply in most instances:

1. *Eyes and skin* – flush with water for 15 minutes.
2. *Inhalation* – Move to fresh air and administer artificial respiration or CPR if you know how.
3. *Swallowing* – Get medical assistance and check MSDS or call the poison control center. Do not give an unconscious person fluids.

Fire Prevention: Fire protection will be in accordance with all Federal, State and Local Codes and Regulations. Where portable fire extinguishers are provided, the following minimum guidelines are applicable.

1. Access to fire fighting equipment will be maintained at all times.
2. Fire fighting equipment will be conspicuously located and distinctly marked.
3. Fire fighting equipment will be inspected monthly.
4. Fire fighting equipment will be maintained in good operation condition.
5. One minimum rated 2A extinguisher will be provided for every 3,000 square feet of building and spaced not more than 100 feet apart.
6. One extinguisher will be posted adjacent to each stairway on each floor.



7. At all time maintain good housekeeping practices to reduce the risk of fire damage and personal injury. Remove all scrap material, rubbish, and trash from the work site daily.
8. When not in use, store flammable and/or combustible material outside in suitable labeled containers. **Inside storage of flammable materials is prohibited.**
9. A fire watch is to be posted when welding/cutting operation present potential fire hazards. This watch is to remain for at least 30 minutes after the welding/cutting operation is completed to assure that no fire begins due to residual effects of the operation.
10. Fuel storage and filling operations are to be conducted with prudence and utilizing common sense and in accordance with NFPA or local regulations.
11. Unless otherwise posted, smoking will not be allowed within buildings or temporary storage sheds.

Project Safety Policies that have been implemented imply that “if you attempt to put out a fire in its first 30 seconds, you stand a good chance of being successful.” During the first 30 seconds, emergency assistance should be followed by anyone discovering or involved in a fire.

Area supervisors shall respond to the following as applicable:

1. A fire is to be evacuated in regards to controlling it.
2. Necessary evacuation steps are to be taken.
3. The evacuation procedure is to be carried out.
4. Site security measures are to be established as necessary to keep “thrill seekers” and non-essential people out and to safeguard records and equipment.



When directed to evacuate a building under threat of fire, employees should observe the following points:

1. Permanent elevators are not to be used unless directed.
2. Lights to be left on, doors and windows closed but not locked.
3. Employees to stay as low as possible and try to keep out of the smoke (possibly toxic).
4. Should clothes catch on fire, the best thing is to drop and roll.

MODIFIED WORK POLICY

The purpose of the Titanium Excavation Modified Work Program is to minimize the results of an injury for both the employee and the company.

"Modified work", means temporarily placing the employee in a working environment that would not cause a further aggravation of an injury or previously existing condition. Modified work is accomplished by working directly with the employee, their supervisor and treating physician. Employees and treating physicians must understand the Titanium Excavation modified work program. This is the responsibility of the project supervisor and the Titanium Excavation Insurance Coordinator.

The employee must notify his direct supervisor and project supervisor immediately of any injury or condition that would place him or her in jeopardy during normal work assignments. Failure to report any such condition may be grounds for termination of employment and denial of workers' compensation benefits.



If the employee is under a physician's care, the employee must report this to his or her direct supervisor and the project supervisor immediately. A copy of the treating physician's report listing specific work restrictions must be presented to the project supervisor. The supervisor will then work with the employee to place the employee in a temporary modified work position that will not violate any restrictions listed by the treating physician.

Employees placed in a modified work assignment must inform their supervisor of any required physician visits that may occur during normal working hours. Otherwise, the employee will be required to be on the project during normal working hours. Efforts will be made to keep the employee working on the project where the injury may have occurred. However, this may not be feasible in all cases. The employee may be required to report to another work location where a more suitable work environment can be developed.

Any employee placed on a modified work assignment will be evaluated on a weekly basis to monitor his or her recovery and ability to return to a regular work assignment. This will be the responsibility of the project supervisor, working in conjunction with the employee, treating physician, supervisor, and the Titanium Excavation corporate office.

Subcontractors who have employees injured or placed in a modified work assignment as a result of an incident that occurred on a Titanium Excavation project or has a pre-existing work restriction are required to provide weekly medical updates on the employee's condition to the project supervisor and Titanium Excavation corporate office.



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FALL PROTECTION (Applicable OSHA Standard 1926.500)

On all Titanium Excavation's job-sites, if you are working in areas with a fall hazard of more than 6 feet to a lower level, fall protection is required. If you are moving materials, or operating equipment within 15 feet of the edge, fall protection is required.

Two basic fundamentals to fall protection are "Engineered Solutions" and Personal Protective Equipment.

"Engineered Solutions" consist of the following:

Railings:

Unless the context requires otherwise, **railing and toeboard** terms shall have the meanings ascribed in this paragraph.

- The **top rail** must be capable of withstanding a force of 200 pounds in any outward or downward direction. At any point of the top edges, and 42" (+/- 3") above the walking/working surface.
- The **mid rail** must be a minimum height of 21" and be capable of withstanding a force of 150 pounds in any outward or downward direction.
- The **toe board** must be a minimum height of 4" nominal board width, less than 1/4" off the surface, capable of withstanding a force of 50 pounds in any outward or downward direction, with openings not greater than 1". A common 2x4 is generally acceptable by OSHA if it is high enough to abate the hazard.



Barricades and Warning Lines:

Barricades and warning lines can be used (where applicable) as an alternative railing system under the following conditions:

WARNING LINES: In areas of construction where work is not taking place within 15 feet of the edge or drop off, a warning line can be used to warn employees not to proceed past that warning line.

- A Warning line System can consist of a rope or cable no less than 34” and no more than 39” from the walking/working surface.
- The Stanchion Supports for the rope or cable must be capable of resisting a horizontal force of 16 pounds.
- The rope or cable must have a tensile strength of 500 pounds.
- The rope or cable must also be flagged at 6’ intervals, OSHA 1926.500 (7) (b), with a high visibility material.
- Any workers whose work requires them to be between the warning line system and the edge must be wearing the appropriate personal Fall Protection System (fall protection harness, fixed length lanyard, etc.).

ATTENDANT: An attendant may be placed to warn anyone not to approach an edge or opening until a handrail or other Fall Protection can be developed. The Attendant must be:

- A competent person
- Is trained to recognize the hazards of the job
- Has been given the authority to shut down the job if necessary.



Protection from Falling Objects:

It is every employee's responsibility to protect other employees from falling objects that result from the work they are performing. Some methods of preventing work accidents to other employees are:

- Making sure that any hole in the floor surface greater than 1", but smaller than 12" is covered with a material that will withstand 3X (three times) the maximum weight that will be placed on it, and secured to the floor, and clearly labeled with the work "hole" or "cover."
- Any floor opening greater than 12" in the smallest dimension needs either a cover or an approved guardrail system.
- Any wall opening that has a bottom less than 39" above the walking/working surface, and is at least 30" high, and 18" wide, must have a guardrail system.
- Any wall opening less than 4" above the floor must have a 4" toeboard installed to prevent material from falling through the floor.
- Protecting others from hazards caused by your work may involve barricading off a controlled access zone to restrict your area to others, and posting it as a "Mandatory Hard Hat Area."

Fall Arrest:

The components of a fall arrest system consist of:

- Full Body Harness – most Full Body Harnesses are approved for 310 or 420 pounds. If you and your tool belt exceeds the weight rating, you cannot wear personal fall protection equipment. You cannot wear personal fall protection equipment if you have a back injury or are being treated for a back injury.
- Shock Absorbing Lanyard – In a Fall Arrest application, this lanyard can be attached to the back D-ring of the harness only. Depending on the circumstances a double lanyard may be required to provide 100% fall protection.
- Connector (or Carabineer) - One end of the shock absorbing lanyard is connected to the back D-ring of the harness, and the other end is connected to the Connector, (or Carabineer). The Connector or



Carabineer is then connected to the “Anchorage Point.”

- Anchorage Point – May be an engineered type or a structural member that will withstand a 5000-pound force.

In a fall arrest system, the Anchoring Point must be capable of withstanding a 5000-pound force, and be high enough the D-ring (using a lanyard of proper length) to ensure that the employee does not free fall more than 6 feet, nor contact any lower level.

Additional fall arrest equipment would include:

- Vertical life lines – only one person at a time may be attached using a 5000-pound capacity.
- Horizontal life lines – must be strong enough to withstand 5000-pound between supporting stanchions.
- Cable Connectors – minimum 3/8” cable, formed eyes at both ends, 3 cable clamps per end, and capable of supporting 5000 pounds (in a full restraint system, capable of supporting 500 pounds).

Fall Restraint Systems:

A Fall Restraint System may be used on horizontal surfaces and consists of:

- Full Body Harness – most manufactured full body harnesses are approved for 310 or 420 pounds.
- Fixed Length Lanyard – attached to the front or back D-ring of the harness, and must be of the proper length to prevent an employee from falling over the edge.
- Connector – (if needed)
- Anchorage Point – in a fall restraint system, the anchorage point must be capable of supporting 3000 pounds.

All Anchorage Points need to be thoroughly inspected to ensure that they will work for their designed purpose. If you have any questions concerning anchorage points, contact the project superintendent.



Cable Connectors (Drop Lines):

Cable connectors may be used as an extension of the anchorage point and must meet the following requirements:

- Cable must be a minimum of 3/8" diameter.
- Able to withstand a 5000-pound force (fall arrest).
- Able to withstand a 3000-pound (fall restraint).
- Two (2) formed eyes.
- Three (3) cable clamps on each end.

For some tasks, the “positioning” fall arrest system may work best and consists of:

- Full body harness.
- Two (2) fixed length lanyards (must connect to side D-rings of harness).
- Two (2) anchorage points capable of withstanding a 5000-pound force per lanyard.

It is each employee’s responsibility to inspect and care for each piece of fall protection equipment prior to each use. Each user will determine that the equipment is not serviceable, tag it “Out of Service,” return it to the storage area and notify the project superintendent. Some items to look for in your inspection are:

- Stitching
- D-rings
- Discoloration
- Cuts and tears
- Cleanliness



Portable Ladders:

Portable ladders do not require the use of fall protection system unless you are working in a position that could cause you to fall, or if the task requires you to lean over, or away from the ladder resulting in a potential fall. If fall protection is worn, this does not justify improper use of the ladder.

The OSHA standard provide for an exception where fall protection is not required for making routine inspection. However, if that inspection would create the real probability for a fall, common sense should be employed, and fall protection should be used.



TITANIUM EXCAVATION

LADDER SAFETY (Applicable OSHA Standard 1926.1053)

Causes of Ladder Accidents:

- Climbing or descending improperly
- Failure to secure the ladder
- Attempting to carry a load while climbing
- Modifying or altering equipment (drilling holes, removing stabilizer)
- Trying to move ladder while still on it

Ladder Rules and Prevention:

- Use two hands when climbing
- Face the ladder when climbing 1926.1053(b)(20)
- Belt Buckle Rule – does not pass the side rails; do not stand on top two rungs
- Choose the right ladder, length, strength, type base
- Never modify a ladder, drill no holes
- Ladders shall be used only for the sole purpose for which they were designed 1926.1053(b)(4)
- Do not exceed the posted maximum load rating for the specific ladder 1926.1053(b)(3)
- An employee shall not carry any object or load that could cause the employee to lose balance and fall 1926.1053(b)(22)
- Ladders placed in any location where they can be displaced by workplace activities or traffic, such as in passageways, doorways, or driveways, shall be secured to prevent accidental displacement, or a barricade shall be used to keep activities or traffic away from the ladder 1926-1053(b)(8)
- Be sure to include a barricade on the opposite side of the door from the ladder as well as secure all extension ladders



- When portable ladders are used for access to an upper landing surface, the ladder side rails shall extend at least 3 feet above the upper landing surface 1926.1053(b)(1)
- Ladders shall be maintained free of oil, grease, and other slipping 1926.1053(b)(2) hazards
- Ladders shall not be tied or fastened together
- Ladders are not to be used as planking or a platform in a horizontal situation
- Daily use of a fixed ladder requires a construction stairways to be built and used in place of fixed ladder – contact your superintendent
- When working on a ladder above moving machinery or dangerous equipment, pits, or tanks, you are required to either guard or cover the potential hazard or utilized personal fall protection devices
- Ladders shall not be moved, shifted or extended while occupied 1926.1053(b)(11)
- Ladders shall have non-conductive side rails where either the employees or ladder could contact energized wires or equipment (12)
- The area around the top and bottom of ladders shall be kept clear (9)
- Cross-bracing on the rear section of stepladders shall not be used for climbing unless the ladders are designed and provided with steps for climbing on both front and rear sections (14)

Chose the Right Ladder:

- Consider work surfaces, location – for type of feet (stability)
- Environmental (electrical hazard?)
- Considerations – type (step, single or straight, extension); length (extension or straight ladder, 3’ past landing edge); strength – OEM Max. (weight posted on ladder)
- Ladders shall be used only on stable and level surfaces unless secured to prevent accidental displacement
- Ladders shall not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental displacement 1926-1053(b)(7)
- Smooth painted concrete, steel grating, and steel plate should be considered on a slippery surface



Ladder Inspection:

Inspect all ladders prior to use. If you find a problem with the ladder, immediately tag it “Out of Service.” Problems include:

- Missing bolts or rivets
- Missing, bent or loose rungs
- Missing or damaged rubber feet
- Bent or missing spreader bars or braces
- Bent or split side rails

For ladder placement using straight or extension ladders, the measured distance out from the wall for placement of the foot of the ladder should be $\frac{1}{4}$ the length of the ladder from the foot to the top supporting surface of the wall.

Fall protection for portable ladders is required only if the task you are performing causes you to:

- Lean out over the edge of the ladder (belt buckle rule) causing a potential fall
- If there is dangerous moving machinery, equipment, pits or tanks beneath the ladder
- If you feel more comfortable using fall protection, **you should use it**
- **Even if you are in fall protection, you must still practice Ladder Safety**



TITANIUM EXCAVATION

PERSONAL PROTECTIVE EQUIPMENT (PPE) PLAN (Applicable OSHA Standard 1926.28) (Sub Part E)

Purpose:

The Personal Protective Equipment Plan provides direction to managers, supervisors and employees about their responsibilities in the selection, use, care and disposal of personal protective equipment

Objective:

Personal protective equipment and devices should only be used when it is impossible or impractical to eliminate a hazard or control it at its source through engineering design. Wearing personal protective equipment does not eliminate the hazardous condition. Every effort will be made to first eliminate the hazardous condition through engineering and/or administrative control strategies. If it is not possible or feasible to eliminate hazardous conditions, personal protective equipment will be used to establish a barrier between the exposed employee and the hazard to reduce the probability and severity on an injury.

Responsibilities:

Project superintendents are responsible for conducting worksite task analysis to identify hazardous conditions to assess the need for personal protective equipment. Sources of hazards include:

1. Hazards from impact/motion, high/low temperatures, chemicals, materials, radiation, fall objects, sharp objects, rolling or pinching objects, electrical hazards and workplace layout.



Select appropriate personal protective equipment. If a task exposes an employee to hazards which can not be eliminated through engineering or administrative controls, the superintendent will identify and select personal protective equipment suitable for the specific task performed, conditions present, and frequency and duration of exposure.

Train employees before they are assigned to a hazardous task. Training should include:

1. When PPE is necessary.
2. What PPE is.
3. How to properly don, doff, adjust, and wear PPE.
4. The limitations of the PPE.
5. Proper care, maintenance, useful life, and disposal of the PPE.

After the employee demonstrates correct use, care and disposal procedures of the PPE, the superintendent and employee will certify completion of training.

Supervise employees on safe use and care of PPE. Supervisors will regularly monitor employees for correct use and care of PPE and provide follow-up training, if required, to ensure each employee has adequate skill, knowledge and ability to use PPE.

Enforce PPE safety rules. Supervisors will enforce PPE safety rules following Titanium Excavation disciplinary actions.

Employees are accountable to comply with PPE safety rules including:

- Correct use and care of PPE.
- Reporting changes in exposure to hazardous conditions that might require a follow-up analysis of the task for PPE.
- Reporting and replacing defective PPE.



Selection Guidelines:

1. *Eye and Face Protection* – Employees must use appropriate eye or face protection when exposed to eye or face hazards from flying practices, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation. Eye and Face PPE must comply with ANSI Z87.1-1989 or be demonstrated to be equally effective.
2. *Head Protection* – Employees must wear protective helmets when working in areas where there is potential for injury to the head from employee initiated impact or impact from falling or other moving objects. Protective helmets designed to reduce electrical shock hazards will be worn by each employee when near exposed electrical conductors which could contact the head. Helmets will comply with ANSI Z89.1-1986 or be equally effective.
3. *Foot Protection* – Employees must wear protective footwear when working in areas where there is a danger of foot injuries due to falling or rolling objects, or from object piercing the sole, and where employees' feet are exposed to electrical hazards. PPE or foot protection must comply with ANSI Z41.1-1967 or be equally effective.
4. *Hand Protection* – Employees must use hand protection when their hands are exposed to hazards such as those from skin absorption of harmful substances; severe cuts or lacerations; severe abrasions; punctures; chemical burns; and thermal burns and harmful temperature extremes. Supervisors must base selection of hand protection on evaluation of the performance characteristics of the hand protection relative to the specific tasks to be performed, conditions present, duration, duration of use and the hazards and potential hazards identified.

5. *Respiratory Protection* – Employees will use appropriate respiratory protection when adequate ventilation or substitution with non-toxic chemicals, etc. is not possible or feasible. Respirator protection must comply with ANSI Z288.2-1969 or be equally effective.
6. *Fall Protection* – Fall protection must be provided when employees are exposed to a vertical fall of six feet or more over a lower level or dangerous equipment. Fall protection will consist of either passive or active fall protection. Fall protection must comply with ANSI A10.14-1991 or be equally effective.

Monitoring:

Supervisors will monitor worksite tasks for changes in, or the introduction of new hazards. If new hazards are discovered, they will conduct a task analysis for appropriate PPE. A worksite analysis will be conducted periodically for each task that requires employees to use PPE.

Titanium Excavation Mandatory Requirements:

It is a requirement on each Titanium Excavation project to have all employees wear:

- Hard hats *when overhead hazards exist*
- Safety eye wear appropriate to hazard exposure *when eye hazards exist*
- Appropriate safety footwear
- Hearing protection (in areas of noise levels above 85 dB)

Personal Protective Equipment need not be worn in office, lunchrooms, and washrooms/change rooms.



TITANIUM EXCAVATION

ELECTRICAL SAFETY

(Applicable OSHA Standard 1926.subpart K)

Preventing and Eliminating Hazards

All electrical work done at Titanium Excavation job-sites must be performed by a qualified (registered with the State of Idaho as an apprentice or journeyman electrician) electrician. The potential for electrical hazards exists in all work environments. There are two basic categories to be aware of when considering electrical hazards. The more obvious of those two is Biological Hazards.

Biological Hazards:

The most common Biological Hazards occur when your body becomes part of the electrical circuit. The following are examples of biological hazards to be aware of:

- Exposed wires – treat all wires as “live” until tested and locked-out by a qualified electrician.
- Frayed power/extension cords – inspect each cord prior to each usage to ensure that the cord insulation has not been compromised. Remove all frayed cords from service.
- Water around/near tools or machines – Always use a GFCI protected system and grounded hand tools.
- Uncovered switches or receptacles – Always assume that they are “live.”
- Missing ground prongs on power cords.
- Ignoring barricades or warning signs or panels on equipment.
- Failure to de-energize or lock-out equipment – Use extreme care in areas where electricians are working on “live” or exposed systems.
- Accidental start-up of equipment due to improper “Lock-out, Tag-out” procedure – “Lock-out, Tag-out” controls must be in effect when working on or around equipment.



Environmental Hazards:

Environmental hazards are another category and includes “FIRE” resulting from:

- Arcing and overheating of electrical systems or individual components of that system.
- Improper sizing of electrical cords and wiring for the load it is to carry.
- Sparks that could ignite flammable vapors.

General:

Cord control is an essential part of electrical safety. Additional mandates are:

- Do not put electrical cords where they may be damaged or abused.
- Do not put cords where equipment can run over them or under doors that will cut them when they close.
- Flat cords not permitted in construction.
- Periodic inspection required.
- Walkways must be kept clear of cords.
- Do not let electrical cords hold doors open. Block or wedge the door in such manner as to prevent damage to the cord.
- Extension cords and electrical tools shall have GFCI in conductive, wet or potentially wet areas.
- Extension cords and cable may not be used where run through holes, doorways or windows.

Safe Clearance:

Many fatal overhead accidents occur when people, or the material they are handling, come in contact with overhead power lines. The following distances must be maintained at all times:



Minimum Safe Approach Distance (MSAD)
To energized (exposed or insulated) power lines

<u>Voltage Range</u>	<u>Distance</u>
600V to 50kV	10 feet
50kV to 200kV	15 feet
200kV to 350kV	20 feet
350kV to 500kV	25 feet
500 kV to 750kV	35 feet
750 kV to 1000kV	45 feet

Many accidents occur when people try to rescue shock victims. **DO NOT ATTEMPT TO RESCUE SHOCK VICTIM.**

If you encounter any electrical hazards that need corrected, contact job-site superintendent.

OSHA's ground-fault protection rules and regulations (1926.404) have been determined necessary and appropriate for employee safety and health. Therefore it is our policy to provide either (1) ground fault circuit interrupters on all construction sites for receptacle outlets in use and not part of the permanent wiring of the building or structure; or (2) a scheduled and recorded assured equipment grounding conductor program covering all cord sets, receptacles that are not part of the permanent wiring of the building or structure, and equipment connected by cord and plug that are for use or used by employees.

Ground-Fault Circuit Interrupters

Ground- fault circuit interrupters will be required for all 120-volt, single phase, 15-and 20-ampere receptacle outlets on construction sites that are not part of the permanent wiring of the building or structure. Receptacles on the ends of extension cords are not part of the permanent wiring and, therefore, must be protected by GFCI's whether or not the extension cord is plugged into permanent wiring.



TITANIUM EXCAVATION

HAZARD COMMUNICATION PROGRAM (Applicable OSHA Standard 1926.59)

Policy:

To ensure that information about the dangers of all hazardous chemicals used at Titanium Excavation job-sites are known by all affected employees, the following hazardous information program has been established. Titanium Excavation staff is committed to the prevention of incidents or happenings which result in injury and/or illness; and to comply with all applicable federal and state safety and health regulations.

All applicable work units of the company will participate in the hazard communication program. The project superintendent will determine if a HazCom program is necessary. This written program will be available for review by any interested employee. This program will be available at each Titanium Excavation job-site. Each employee will be given this information individually for reference and during initial orientation.

Container Labeling:

Titanium Excavation project superintendent will verify that all containers received for use will be clearly marked as to the contents, note the appropriate hazard warning, and list the name and address of the manufacturer. It is Titanium Excavation's policy that no container will be released for use until the above data is verified.

Project superintendent will ensure that all secondary containers are labeled with either an extra copy of the original manufacturer's label or with labels that have the identity and the appropriate hazard warning.

Project superintendent will review the company labeling procedures every 6 months and update as required.



Material Safety Data Sheets (MSDS):

Project superintendent is responsible for establishing and monitoring the company MSDS program. They will make sure procedures are developed to obtain the necessary MSDS's for new or significant health and safety information. They will see that any new information is passed on to affected employees. New chemicals or chemicals that have changed ingredients should be updated and included in the MSDS files.

Copies of the MSDS's for all hazardous chemicals in use will be kept on location at each Titanium Excavation job-site. MSDS's will be available to all employees during each work shift. If a MSDS is not available, immediately contact the project superintendent.

Employee Training and Information:

Project superintendent is responsible for the Titanium Excavation employee training program. They will ensure that all program elements specified below are carried out.

Prior to starting work, each new Titanium Excavation employee will attend a health and safety orientation that includes the following information and training:

- An overview of the requirements contained in the Hazard Communication Standard.
- Hazardous chemicals present in the work place.
- Physical and health risks of the hazardous chemicals.
- The symptoms of overexposure.
- How to determine the presence or release of hazardous chemicals in his/her work area.
- How to reduce or prevent exposures to hazardous chemicals through use of control procedures, work practices and personal protective equipment.
- Steps the company has taken to reduce or prevent exposure to hazardous chemicals.



- Procedures to follow if employees are overexposed to hazardous chemicals.
- How to read labels and review MSDS's to obtain hazard information.
- Location of MSDS file and written hazard communication program.

The orientation covered by project superintendent will be signed and dated by Titanium Excavation employee. This shall ensure that each employee has been properly trained in HazCom. The signed orientation will be kept on file for documentation of that training. Before introducing a new chemical hazard into any section of this company, each employee in that section will be given information and training as outlined above for the new chemical hazard.

Hazardous Non-Routine Tasks:

Periodically, employees are required to perform hazardous non-routine tasks. Some examples of non-routine tasks are: *confined space entry, tank cleaning and painting*. Before starting work on such projects, each affected employee will be given information by project superintendent about the hazardous chemicals they may encounter during such activity. This information will include specific chemical hazards, protective and safety measures the employee can use, and steps the company is using to reduce the hazards including *ventilation, respirators, presence of another employee and emergency procedures*.

Project superintendent will also inform the employees of any precautionary measures that need to be taken to protect employees during normal operating conditions or in foreseeable emergencies, and provide them with an explanation of the labeling system that is used at the work site.

List of Hazardous Chemicals:

The following is a list of all known hazardous chemicals used by Titanium Excavation employees. This list should be completed as to give quick reference to first aid and emergency procedures, in the event a chemical enters the body. Further information on each chemical may be obtained by reviewing MSDS's located at each Titanium Excavation job-site.



	Chemical	Eye	Skin	Inhaled	Swallowed
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					



Preliminary First Aid:

The following information is being provided to the Titanium Excavation employees to give them important preliminary first aid methods to consider if they are exposed to hazardous materials.

Chemicals in the eyes

1. Don't rub the eye(s).
2. Hold the eyelid(s) open and flush eyes with clean water. Continue for 15 to 20 min.
3. Be careful not to contaminate the other eye.

Chemicals on the skin:

1. Flush burned area thoroughly with lukewarm water for at least 15 min. Be sure to wash the chemical away completely.
2. Remove clothing and jewelry from burn area. If clothing is sticking to the burn, do not try to remove it.
3. Seek further medical attention.

Inhalation of Chemicals:

- 1 After you have identified the chemical, move the victim to fresh air immediately.
- 2 Get help.



Ingestion of Chemicals:

- 1 Induce vomiting only if instructed by the Poison Control Center or MSDS. When a chemical has been swallowed, making the victim vomit may or may not be the right thing to do.
- 2 Get immediate medical attention.

***IMPORTANT NOTE:** For specific first-aid procedures for a particular hazardous material, read the emergency instructions on the MSDS.

When you follow the proper precautions, you can work safely and effectively with hazardous materials. The following is a safety checklist that should be used every time you do a job that involves handling hazardous materials:



HAZARDOUS MATERIALS CHECKLIST

1. Use the safety equipment required by your employer.
2. Check your clothing and be aware for signs of wear.
3. Remove your contact lenses if vapors might be present.
4. Pay attention to all warning labels and signs.
5. Read the label on every container before you handle it.
6. Check with your supervisor before handling any container which you are not familiar.
7. If you are unfamiliar with a hazardous material, be sure to read the MSDS.
8. Take all precautions recommended on the label or in the MSDS.
9. Ask you supervisor for more information if there is anything you don't understand.
10. Make sure you know how to get help in case of an emergency.
11. Review first-aid procedures and know where emergency stations are located.
12. Make sure you know where fire extinguishers are kept.
13. Know where the nearest emergency exits are located.

<i>Employee Signature</i>	<i>Date</i>
<i>Supervisor Signature</i>	<i>Date</i>



TITANIUM EXCAVATION

ENERGY ISOLATION (Applicable OSHA standard 1926.417)

OSHA requires you to lockout/tagout when:

- You do service or maintenance on machines or equipment when **UNEXPECTED** start-up or release of energy could cause injury. This includes work done during construction, remodel, or demolition.
- Lockout/tagout applies to normal production operations when you remove or by-pass a guard or if any part of your body is put in jeopardy.

When doing maintenance, construction or demolition tasks, you must lockout/tagout all sources of energy on the equipment you are servicing. In situations where multiple components of equipment join to form one larger piece of equipment, all sources of energy specific to the specific component you are servicing need to be individually locked out. This can only be done when the individual working on the single component can do so without danger from the other components.

The intent of Energy Isolation is to protect employees from dangerous sources of energy. Some (but not all) of the sources that need to be considered are:

- Electrical – potential for shock
- Mechanical – pinching, crushing, cutting, or rolling action due to accidental equipment startup
- Hydraulic – pinching, crushing, cutting, or rolling action due to accidental equipment startup
- Pneumatic - pinching, crushing, cutting, or rolling action due to accidental equipment startup



- Thermal – potential for burns (steam)
- Chemical – health hazards, burns from exposure to chemicals
- Compressed gasses – health and physical hazards

When applying Lockout/Tagout devices, use both locks and tags whenever possible.

- A tag may be used by itself when it is physically impossible to use a lock and tag
- A tag by itself is only a warning device and may give a false sense of security
- The lock and tag must be placed on the energy isolation device itself such as a circuit breaker, disconnect switch, or valve
- If the source of energy is a plug/outlet, you must have control of the plug end; if you cannot control the plug end, you must lock/tag it with an appropriate plug lock device
- Never lock anything in the “on” position

All energy isolation tags will be provided by Titanium Excavation and are available at each job-site location.

- Tags must be attached with tie-wraps and placed right on the lock or energy isolation device
- Be very specific with the information placed on the tag
- Write legibly and fill out the tag out completely
- Do not remove or ignore someone else’s tag

Participants in the energy isolation procedure are defined as:

- **AUTHORIZED** – a person who locks out or tags out machines or equipment in order to perform servicing or maintenance or that machine or equipment to include construction and demolition
- **AFFECTED** – An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which servicing or maintenance is being performed.
- **OTHERS** – Anyone who *may* work in an area that *might* be locked out



- **GROUP LOCKOUT COORDINATOR** – Individual designated during group lockout to be the first person to place the lock and the last person to remove the lock after verifying everyone else is complete.

The six steps in energy isolation procedures performed by the “authorized” person are:

- Verify the source(s) and magnitude of energy involved and notify all affected employees
- Shut down the machine or system and verify the area impacted; be sure to follow shut down procedures for the specific equipment (if procedures are available)
- Isolate the system at the energy source using the appropriate energy device; source would most likely be, an electrical panel, breaker or valve supplying the energy; most equipment is built with a designated isolation device (if you are unsure, contact the equipment owner to verify)
- Apply locks or tags to the isolation device; it must be placed in the “off” or “safe” position; any time you place a lock, a completely filled out tag is **required** to be attached to the lock
- Release or restrain the stored energy in the system and ensure that there is no release until the lockout/tagout is completed
- Verify the lockout by thoroughly checking the system to ensure that there is no energy present; be aware of the potential for energy to be back fed into the system in an unexpected manner which could cause potential injury or system damage

To release the system/equipment from lockout/tagout, the “authorized” person must:

- Inspect the system/equipment to ensure all work is completed and safety guards and covers are in place
- Notify all “affected” personnel to ensure their safety as the equipment is energized
- The “authorized” person should then remove the lockout/tagout device and energize the system



Anytime you energize a locked out piece of equipment, even for brief periods of testing, all of the above steps must take place. When testing is completed and equipment is locked out, the six energy isolation procedures must be followed.

Procedures for a group lockout/tagout are:

- If more than one person or trade is involved, a designated “authorized” person is appointed as the “group lockout coordinator;” this competent person must be aware of the exposure to hazards status of everyone in the group
- The “group lockout coordinator” will install the lockout device along with his lock and the appropriate tag before anyone else
- All other tradesmen will install their own lock and tag on the device as long as they are still working on the system
- As each tradesmen completed their portion of the work, they must remove their locks/tags
- The group lockout coordinator” is the last to remove his/her lock and the system may be re-energized after a thorough pre-startup inspection is complete along with notifying all “affected” personnel



TITANIUM EXCAVATION

TRENCHING AND EXCAVATION (Applicable OSHA Standard 1926.650-.652, sub-part P)

On the Job Evaluation

OSHA requires that a competent person inspect on a daily basis, excavations and the adjacent areas for possible cave-ins, failures of protective systems and equipment, hazardous atmospheres or other hazardous conditions.

Cave-ins and Protective Support Systems

Excavation workers are exposed to many different hazards, but the main hazard is danger of cave-ins. Titanium Excavation requires that all employees working in and around trenches or excavations (greater than 5 feet deep or if the competent person determines protective systems are needed less than 5 feet deep) be protected from cave-ins by the following methods:

1. Sloping and Benching Requirements outlined in 1926.652(b)
2. Support Systems, Shields, Bracing/Shoring and Other Protective Systems as outlined in 1926.652(c)

Other Hazards

In addition to cave-in hazards and secondary hazards related to cave-ins, there are other hazards from which workers must be protected during excavation-related work. These hazards include exposure to falls, falling loads and mobile equipment. To protect employees from these hazards, the following precautions must be taken:

- Keep materials (including spoil piles) or equipment that might fall or roll into an excavation, at least 2-feet from the edge of excavations, have retaining devices or both



- Provide warning systems such as mobile equipment barricades, hand or mechanical signals, or stop logs to alert operators of the edge of excavation; if possible, keep the grade away from the excavation
- Provide scaling to remove loose rock or soil, or install protective barricades and other equivalent protection to protect employees against falling rock, soil or materials
- Prohibit employees under loads that are handled by lifting or digging equipment; to avoid being struck by any spillage or falling materials, employees are required to stand away from vehicles being loaded or unloaded

Water Accumulation

Employees are prohibited from working in excavations where water has accumulated or is accumulating. Water removal equipment will be used to remove, control or prevent water from accumulating and such operations will be monitored by the project superintendent. Diversion ditches, dikes or other suitable means will be used to prevent surface water from entering an excavation and to provide adequate drainage of the area adjacent to the excavation.

Hazardous Atmospheres

Excavations greater than 4-feet in depth, as well as those where oxygen deficiency or hazardous atmosphere exists or could possible exist, must be tested before an employee is allowed to enter. If a hazardous condition does exist, controls such as proper respiratory protection or ventilation must be provided. Controls used to reduce atmosphere contaminants to acceptable levels must also be tested regularly.

Access and Egress

Titanium Excavation will provide employees with a safe means of access and egress to all excavations. In accordance with OSHA regulations, when employees are required to be in a trench 4-feet deep or more, adequate means of exit such as ladders, steps, ramps or other safe means of egress must be provided and be within 25-feet of employees' lateral travel.



TITANIUM EXCAVATION

HEAVY EARTH MOVING & HANDLING EQUIPMENT (Applicable OSHA Standard 1926.600, sub-part O)

General

The safe operation of heavy equipment involves two very important areas:

1. Selection and training of operators

Only able-bodied, trained and qualified employees will be permitted to operate any piece of heavy equipment. Training will include a thorough review of hazards, safe and un-safe procedures and a good working knowledge of the machine itself. All operators shall read the operators manual including all warnings and precautions. Titanium Excavation requires all equipment operators to wear seatbelts at all times when operating heavy equipment. Project superintendents will see that proper supervision is exercised over an operator until assurance is established that the employee can be left on his own.

2. Maintenance

Maintenance programs will be thorough, workable and consistent with the manufacturer's specifications. Many injuries and considerable equipment damage can be averted through proper attention to such items as motors, blades, tracks, drives, wire ropes and sheaves, hydraulic and braking systems, and other vital parts.

A systematic preventative maintenance program will be established and records will be kept.



Safe Operating Procedures

The condition of equipment will be checked prior to operation. This will include brakes, clutches, steering mechanisms, and hydraulic and electrical systems. Any defects shall be reported to project superintendent immediately for correction. All equipment operated by Titanium Excavation shall have a Roll Over Protective Structure (ROPS).

Bulldozers and Tractors

Safety canopies/rollover devices must be in place to protect operators from falling material and rollovers.

Before starting down a hill, the blade should be lowered to secure the load of earth in front of it and maintain the load all the way down the hill. If the load is lost, the blade should not be lowered or jammed into the ground, as this may cause overturning. The bulldozer blade must never be used as a brake on a downhill grade.

Filling operations can be extremely dangerous. The material should be pushed over the edge, only as far as necessary. This could prevent the possible overturning of machine.

When coupling a tractor to other equipment, workers should stand clear of the space between units. The machine should be stopped, transmission placed in neutral, and the brakes set before a person is allowed to couple the equipment.

At the end of work shifts, or when leaving the machine, the power should be shut off, brakes set, blade landed, and the shift level placed in neutral.



Scrapers

Avoid sharp downhill turns and do not turn top-heavy with the apron up in the air. When going downhill, the operator should not kick the machine out of gear because increased speed may make control of equipment difficult. Operator should leave the machine in gear and use brakes to control speed. If the brakes will not hold the load, the operator should drop or drag the bowl or make an emergency stop.

The scraper or dozer bowl should always be blocked up when blades are being replaced. After the scraper is lifted to the desired height, blocks should be placed under the bottom near the ground plates. Apron arms are raised to extreme height, and a block is placed under each arm, allowing the apron to drop enough to wedge each block firmly in place.

To prevent the scraper from slipping off the edge of a fill, keep the center of the fill low and outside edges high.

Shovels, Trackhoes and Loaders

All workers should be clear of the bucket swing and the cab rotation. Never swing the bucket over other workers.

When soil is soft, make sure the equipment is on solid foundation, such as mats or heavy planking, with outriggers fully extended before starting to operate.

Before operating on a bank next to an excavation, a check should be made with the project superintendent to determine whether shoring or bracing is necessary.

Never operate closer than 10 feet from overhead electric lines (for lines under 50 kV) or see that power is temporarily shut off or wires relocated. Always contact the power company to determine the voltage in the overhead lines and calculate the MSAD.



No one should be permitted in the cab with the operator.

Make sure the bucket and all appendages are kept on the ground, or on blocking when not being operated. Never leave the cab while master clutch is engaged.

Motor Trucks

No person should be permitted to remain in or on a truck being loaded by excavating equipment or crane, unless cab is adequately protected against heavy impact.

Material loaded should be within safe limits for the truck and should not project beyond the truck body in such a manner as to present a hazard to other vehicles, pedestrians or structures.

Never carry a load in excess of the rated capacity of the vehicle. When necessary to operate nonpublic highways, do not exceed the legal, gross vehicle weight limits. Be sure proper permits have been secured before carrying any heavy load over a public highway.

Trucks regularly used for transporting personnel should be provided with side and end protection and safe seating to prevent falls. Some convenient means of mounting and dismounting the trucks should be provided.

Workers should not be permitted to get on or off a moving truck at any time.

Personnel should be required to ride only on approved passenger seats with available seatbelts. Personnel should never ride on running boards, fenders, bumpers, pickup beds, atop cabs or elsewhere unless it is designated in the operator's manual.

Dump trucks must not be used to carry personnel unless the body of the truck is locked to prevent operating.



General Safety Rules

Hard hats should be worn by operators when overhead hazards exist, this could include while on the job-site, as well as the controls of a piece of equipment.

Operators should always check to make certain that other workers are in the clear before starting the machine.

Employees should not jump on or off machinery in motion.

Before repairs are made on earthmoving equipment, the operators should make certain that the motor is not running. Motors of all equipment should be stopped before refueling is done.

If possible, equipment should be driven entirely off the road at night. Where any portion of the machine projects into the road, it should be adequately marked with red light, flashers or flares; red flags should be used in the daytime.

Unauthorized riding on equipment should not be permitted.

The operator should never leave machine on an inclined surface or on loose material with the motor idling because vibration could put the machine into motion.

Heavy earthmoving equipment should be equipped with a reverse signal alarm which will operate automatically with backward movement. The alarm should give an audible signal suitable for the conditions. The signal may be continuous or intermittent, but should provide suitable alarm during the entire time of backward movement. Exceptions may be made for light-service trucks, power shovels, draglines and double front end rollers.



TITANIUM EXCAVATION

HAND TOOLS, POWER TOOLS, AND WELDING (Applicable OSHA Standard 1926.300 subpart I, subpart J)

GENERAL

Maintenance: Hand tools, power tools, and jacks shall be maintained in safe operating condition and used only for the purpose which they were designed. Damaged and defective tools shall be repaired or removed from service. Electrical cords shall not be used to raise or lower tools.

Storage: Tools shall not be left on elevated work spaces, and containers shall be provided for hand tools on the job-site.

Guarding: The hazardous moving parts of power tools shall be safeguarded. Belts, gears, shafts, pulleys, sprockets, spindles, drums, and other rotating, reciprocating or moving parts shall be isolated or guarded as set forth in the current edition of ANSI B15.1, "Safety Code for Mechanical Power Transmission Apparatus." Guards, as necessary, shall be provided to protect the operator and others from the following:

- a. Point of operation
- b. In-running nip joints
- c. Rotating parts
- d. Flying chips and sparks

Safety guards must never be removed when a tool is being used. For example, portable circular saws must be equipped at all times with guards. An upper guard must cover the entire blade of the saw. A retractable lower guard must cover the teeth of the saw, except when it makes contact with the work material. The lower guard must automatically return to the covering position when the tool is withdrawn from the work.



Grounding: Electric-powered tools shall be double insulated or effectively grounded.

Switches: On-off switches controlling the operation of hand-held powered tools shall conform to the following requirements:

- a. Hand-held powered platen sanders, grinders with 2-inch or less diameter wheels, routers, planers, laminate trimmers, nibblers, shears, scroll saws, and jigsaws with blade shanks 0.25 inch wide or less may be equipped with only a positive on-off control.
- b. Hand-held powered drills, tappers, fastener drivers, horizontal, vertical, and angle grinders with wheels exceeding 2 inches in diameter, disk sanders, belt sanders, reciprocating saws, and similar tools shall be equipped with a momentary contact on-off control. They may have a lock-on control provided the power can be shut off by a single motion of the same finger(s) that turns it on, and the switch is adequately guarded to prevent accidental operation.
- c. Jackhammers, and similar pneumatic-powered hand tools and other hand-held power tools including chain saws, circular saws, percussion tools, shall be equipped with a constant pressure switch that shuts off power when pressure is released. This paragraph does not apply to concrete vibrators.

Personal protective equipment: Hand tool and power tool operators shall be provided with and use respective type(s) of personal protective equipment.



Hazardous conditions: Only non-sparking tools shall be used in locations where sources of ignition may cause an explosion or fire. Gasoline-powered tools shall not be used underground or in locations where toxic exhaust gases can accumulate. Impact tools including drift pins, wedges, and chisels shall be kept in a dressed condition or equipped with non-mushrooming heads. Employees shall not work under areas where hand-held tools are being used unless the tools are equipped with restraining straps or appropriate decking, planking, and netting are provided for employee protection.

PNEUMATIC TOOLS

Impact tools: Pneumatic impact tools shall be operated with safety clips or retainers installed to prevent tools being accidentally discharged from the chuck.

Air hoses: All connections, couplings, and splices in air lines exceeding 0.5-inch inside diameter shall be equipped with clips and wire rope or chain lashings. The clips and lashings will be installed in a manner that prevents whipping of the hose line should the connection, coupling, or splice fail. A safety device at the source of supply or branch line which will automatically reduce pressure in case of a line failure may be substituted provided the device is demonstrated as effective in preventing whipping.

Operating pressures: The manufacturer's safe operating pressure for hoses, pipes, valves, and fittings shall not be exceeded. Defective hoses, valves, and fittings shall not be exceeded. Defective hoses, valves, and fittings shall be removed from service.

Compressed air: Compressed air shall not be directed at any part of the body. Compressed air shall not be used for cleaning purposes except when reduced to less than 30 pounds per square inch and the operator protected by personal protective equipment. The 30 pounds per square inch requirement does not apply to sandblasting, green cutting, removal of mill scale, cleaning concrete forms, and similar cleaning operations.



Care of air hoses: Air hoses shall not be used for hoisting or lowering tools. Hoses shall not be laid on ladders, steps, scaffolds, or walkways in a manner creating a tripping hazard.

Airless spray guns: Airless spray guns shall be equipped with safety devices which will prevent pulling of the trigger until the safety device is manually released. In addition to the above, a diffuser nut to prevent high pressure release when the nozzle tip is removed and a nozzle tip guard to prevent the tip from contacting the operator or other equivalent protection shall be provided.

Nailers: Pneumatically driven nailers, staplers, and similar equipment provided with automatic fastener feed, which operate at more than 100 pounds per square inch, shall have a single-action trigger and a safety device on the muzzle to prevent the ejection of the fasteners unless the muzzle is in contact with the work surface.

GRINDING TOOLS

Requirement: The installation, guarding, use, and care of grinding tools shall comply with the standards set forth in the current ANSI B7.1, "Safety Code for the Use, Care, and Protection of Abrasive Wheels." Grinding tools shall not be used without the safety guards, protective flanges, and tool rests installed and maintained in proper adjustment.

Abrasive wheels: Abrasive wheels and scratch brush wheels shall not be operated in excess of their rated safe speed. Cracked or defective abrasive wheels shall be removed from service immediately.

Bench grinders: Bench-mounted and floor-stand grinders shall be provided with safety guards that are strong enough to withstand the effect of a bursting wheel. The guard shall not expose more than 90 degrees of the grinding wheel periphery and sides, except if the work is required to contact the wheel below the horizontal plane of the spindle, the angular exposure shall not exceed 125 degrees. The guard shall be provided with a readily adjustable tool rest that is maintained within 1/8 inch of the wheel, and an adjustable tongue maintained within 1/4 inch of the periphery of the wheel.



Cup-type wheels: Cup-type wheels used for external grinding shall be protected by either a revolving cup guard or a band-type guard.

Right angle head grinders: Right angle head grinders shall be provided with a guard having a maximum exposure angle of 180 degrees. The guard shall be located so as to be between the operator and the wheel.

Inspection: All abrasive wheels shall be closely inspected and ring tested before mounting to ensure that they are free from cracks and defects.

Side grinding: Side grinding shall not be permitted unless the abrasive wheel is specifically designed for this purpose.

POWER SAWS

Circular saws: Bench-type circular saws shall be equipped with spreaders, anti-kickback devices, and guards that automatically enclose the exposed cutting edges. Portable hand-held circular saws shall be equipped with guards above and below the baseplate or shoe. The upper guard shall cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts. The lower guard shall cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work. As the blade is withdrawn, the lower guard shall automatically and instantly return to the covering position.

Operating speeds: The operating speed shall be permanently marked on all circular saws over 20 inches in diameter or operating speeds over 10,000 peripheral feet per minute. Only blades designed for use at the marked operating speed shall be used. When the saw is re-tensioned for a different speed, the marking shall be changed to indicate the new speed.

Radial arm saws: Radial arm saws and swing cutoff saws shall be equipped with (1) limit stops which prevent the leading edge of the blade from traveling beyond the edge of the table, (2) hoods and/or guards that protect the operator from flying material, direct the sawdust toward the back



of the blade, and enclose all parts of the blade not in contact with the material being cut, (3) automatic brakes or automatic return devices, and (4) non-kickback fingers or dogs and spreader shall be installed when ripping.

Bandsaws: Bandsaw blades shall be fully enclosed except at the point of operation. The adjustable guide shall be adjusted within 1/2 inch of the work.

Unattended: Power saws shall not be left running unattended.

Sawdust collectors: Bench-type circular saws and radial saws used for production work shall be equipped with enclosed sawdust collectors.

Cleanup: Scrap and sawdust shall not be permitted to accumulate. The shop area shall be cleaned up at the end of each shift.

Defective blades: Cracked, bent, or otherwise defective blades shall be removed from service.

HYDRAULIC-POWERED TOOLS

Safe operating pressures: The manufacturer's safe operating pressure for hoses, valves, pipes, filters, and fittings shall not be exceeded.

Hydraulic fluid: Fluid in hydraulic-powered tools shall be fire resistant type approved by a recognized authority, such as Underwriters Laboratories or Factory Mutual.

Stationary hydraulic-powered presses: Presses shall be provided with guards that adequately contain flying particles forcibly expelled from the material being compressed.



POWDER-ACTUATED TOOLS

Requirement: Powder-actuated tools shall be designed, maintained, and used in accordance with the standards set forth in the current edition of ANSI A10.3, “Safety Requirements for Powder-Actuated Fastening Systems,” and the requirements of this section.

Operator qualification: Powder-actuated tools shall be operated and serviced only by persons who have been trained and certified in the safe use of such tools. Operators must possess an operator's card issued by a firm or person authorized to issue such cards.

Unauthorized use: Safeguards shall be taken to prevent the possession or use of these tools and their charges by unauthorized persons.

Flammable atmospheres: Powder-actuated tools shall not be used in explosive or flammable atmospheres.

Studs and fasteners: Only powder charges, studs, or fasteners specified by the manufacturer for the specified tool shall be used.

Safety features: Tools shall be designed to operate only when pressed against the work surface with a force at least 5 pounds greater than the weight of the tool. They shall be constructed so the tool cannot fire when dropped or during loading or preparation to fire.

Materials: Driving fasteners into soft or easily penetrated material is prohibited unless the material is backed to prevent complete penetration. Tools shall not be used on very hard or brittle materials such as cast iron, glazed tile, surface-hardened steel, glass block, live rock, face brick, or hollow tile.

Use: Tools shall not be loaded until just prior to firing. Loaded tools shall not be left unattended. Tools shall not be pointed at any person, and all parts of the body shall be kept clear of the muzzle.



Inspecting: Tools shall be inspected each day before loading to ensure that the safety devices are in proper working order. The inspection shall be conducted in accordance with the manufacturer's recommended inspection procedures.

High-velocity tools: High-velocity tools shall be used only for those applications where low-velocity tools will not meet the job requirements.

HAND-POWERED WINCHES AND HOISTS

Rated capacity: Hand-powered winches and hoists shall be used within the manufacturer's rated capacity, and the capacity shall be legibly marked on the winch or hoist.

Cranks: The use of hand cranks is prohibited unless the winch or hoist is equipped with self-locking dogs or the worm-gear type. Hand wheels shall not have projecting spokes or knobs.

LEVER AND RATCHET, SCREW, AND HYDRAULIC JACKS

Capacity: The manufacturer's rated capacity shall be legibly marked on all jacks and shall not be exceeded.

Overtravel: Jacks, of any type, shall have a positive stop to prevent overtravel.

Footing and blocking: Jacks shall be set on a stable and firm footing, and cribbed or blocked where necessary to prevent settlement or dislodgment. Where there is a possibility of slippage, a wood block shall be placed between the jack and the load.



COME-ALONG

Capacity: The manufacturer's rated capacity shall be legibly marked on all come-alongs and shall not be exceeded.

Defects: Come-alongs shall be removed from service when they have worn or kinked cables or links, deformed hooks, or defective ratcheting devices.

Structures: Care shall be taken to not overstress structures or structure supporting systems when using come-alongs for leveling, plumbing, or positioning structures.

HANDTOOLS

Wrenches: Wrenches, including adjustable, pipe, and socket wrenches shall not be used when jaws are sprung to the point that slipping occurs.

Wood handles: The wooden handles of tools shall be kept free of splinters or cracks and shall be kept tight in the tool.



WELDING COMPRESSED GAS CYLINDER

Requirement: Compressed gas cylinders shall be constructed, inspected, and tested in accordance with Department of Transportation requirements.

Cylinder storage: On-site storage of gas cylinders shall conform to the following requirements:

- a. *Separation.* Cylinders containing the same gas shall be stored in segregated groups and not intermingled with other gas cylinders. Empty gas cylinders shall be stored in the same manner.
- b. *Confined spaces.* Cylinders shall be stored in well-ventilated spaces. Cylinders containing oxygen, acetylene, or fuel gases shall not be stored or taken into confined spaces.
- c. *Flammable or combustible material.* Cylinders in storage shall be separated from flammable or combustible material by at least 20 feet or by a fire-resistive partition of at least 1-hour fire-resistive rating, and at least 5 feet high.
- d. *Oxidizing gases.* Cylinders containing oxygen or oxidizing gases shall be separated from fuel gas cylinders by at least 20 feet or by a fire-resistive partition of at least 1-hour fire-resistive rating, at least 5 feet high.
- e. *Smoking restrictions.* Smoking or open flame shall not be permitted where cylinders are stored and the area posted with "**DANGER-NO SMOKING**" or "**OPEN FLAME**" signs.
- f. *Toxic gas.* Areas containing toxic gas in storage shall be appropriately posted.

Upright position: Compressed gas cylinders shall be secured in an upright position at all times except when being hoisted or used in special services or arrangements approved in writing by the manufacturer or gas supplier.

Cylinder valves: Cylinder valves shall be closed when cylinders are in storage, in transit, or not in use.

Valve caps: Cylinder valve caps shall be securely in place during storage, transit, and at all times when the regulator is not connected to the cylinder. Cylinders, secured on specialty trucks, may be moved within a job-site with the regulators installed when the regulators and cylinder valves are adequately protected.

Transporting: Compressed gas cylinders transported by crane, hoist, or derrick shall be transported in cradles, nets, or skips; never directly by slings, chains, or magnets.

Valve wrenches: The valve wrench or wheel shall be in the operating position when the cylinder is in use.

Restricted use: Cylinders shall be used only for the designated purpose of containing a specific compressed gas for which they were designed. They shall be refilled only by the supplier.

Handling: Cylinders shall be handled in a manner which will not weaken or damage the cylinder or valve. They shall not be exposed to extremes of temperature, physical damage, or electrical current.

Oxygen: Oxygen cylinders and fittings shall be kept free of oil or grease and shall not be handled with oily hands or gloves. Oxygen shall not be directed at oily surfaces, greasy cloths, or into a container, storage tank, or vessel. Oxygen or other compressed gases shall not be used as a substitute for compressed air.

Defective cylinders: Leaking cylinders shall be removed to an isolated location out of doors, away from personnel, and sources of ignition. The valve shall then be cracked, permitting the gas to escape slowly. The



cylinder shall be tagged **DEFECTIVE** and returned to the supplier. Leaking cylinders containing toxic gas shall be handled only by qualified personnel protected by appropriate personal protective equipment.

GENERAL WELDING AND CUTTING

Applicable standards: All welding and cutting apparatus, equipment, and operations shall be in accordance with the standards and recommendations set forth in the current edition of ANSI Z49.1, “Safety in Welding and Cutting.”

Daily Inspection: Welding apparatus and equipment shall be inspected daily prior to use. Defective apparatus and equipment shall be removed from service, replaced, or repaired and re-inspected before being used again.

Fire extinguishers: Fire extinguishers rated 2-A:40-B:C units or larger shall be immediately available wherever welding or cutting is being carried out.

Fire protection: The following precautions shall be taken, as applicable, when welding or cutting:

- a. *Flammable material.* Welding shall, whenever possible, be confined to areas free of combustible materials. When this is not possible, all combustible material shall be removed or protected from fire, sparks, and slag.
- b. *Fire guards.* When welding, cutting, or heating is such that normal fire prevention precautions are not considered adequate, fireguards shall be assigned to the operation. They shall be on duty during the operations and for a sufficient period of time following the completion of the work to ensure that no possibility of fire exists. Fireguards shall be provided with necessary fire protection equipment and instructed in its use.



- c. *Tests.* Before welding, cutting, or heating any material covered by a preservative coating whose flammability is unknown, a test shall be made to determine its flammability. No welding or cutting shall be done in any area that could contain flammable vapors or gases until the atmosphere has been tested and found safe.
- d. *Shafts.* Noncombustible barriers shall be installed below welding or burning operations in or over a shaft or raise.
- e. *Flammable and combustible liquids.* No welding, cutting, or burning shall be done in areas containing flammable and/or combustible liquids, vapors, or dusts.
- f. *Walls.* When welding or cutting is performed on walls, floors, or ceilings where direct penetration of sparks or heat transfer may introduce a fire hazard to an adjacent area, the same precautions shall be taken on the opposite side as are taken on the side on which the welding is being performed.

Goggles and protective clothing: Welders and helpers shall wear proper protective clothing and eye protection. Further, other persons shall be protected from exposure to welding rays, flashes, sparks, molten metal, and slag. Welding screens shall be installed in repair shops and other areas where welding is done regularly.

Preservative coatings: When preservative coatings are highly flammable, they shall be removed from the area to be heated in order to prevent ignition. The following precautions shall be taken when the coatings are determined to be toxic:

- a. *Confined spaces.* Welding and cutting in confined spaces will conform to requirements outlined in the confined space entry procedures. Additionally, all coated surfaces shall be stripped of the coating for a distance of at least 4 inches on each side of the cut or weld.



- b. *Open air.* Employees in open air shall be protected by either an air line respirator or adequate local ventilation.

Ventilation: Ventilation and protection of employees welding, cutting, or heating in confined spaces shall conform to requirements contained in 1926.353.

GAS WELDING AND CUTTING

Equipment: Gas welding and cutting equipment shall be as listed by Underwriters Laboratories, Inc. or by Factory Mutual.

Gas cylinders: Gas cylinders shall be constructed, transported, handled, stored, used, and maintained.

Regulators: Pressure-reducing regulators shall be used only for the gas for which they were designed. Except for cracking the valve slightly to remove dust or dirt, gas shall not be released from a cylinder under pressure without attaching the pressure-reducing regulator to the cylinder valve. Acetylene regulators shall not be adjusted to permit a discharge greater than 15 pounds per square inch (gauge).

Torches: Torch valves shall be closed and the gas supply shut off when work is suspended. Torch valves shall be checked for leaks at the beginning of each shift. Torches shall be lighted by friction lighters or other approved devices and not by matches or from hot work.

Check valves: All oxygen, acetylene, or other fuel gas-oxygen combinations used in cutting or welding shall have reverse flow check valves installed between the hose and the regulator.

Welding hose: Only properly marked and identified hose in good condition and specifically manufactured for oxyacetylene service shall be used for gas welding and cutting. Hose, which has been subjected to flashback or which indicates evidence of severe wear or damage, shall be removed from service. Containers used for storage of fuel gas hose shall be ventilated.



ARC WELDING AND CUTTING

Applicable standards: Electric arc welding apparatus shall comply with the National Electrical Manufacturer's Association EW1 "Electric Arc Welding Power Sources" and shall be installed, operated, and maintained in accordance with ANSI Z49.1, "Safety in Welding and Cutting."

Power circuits: Power circuits for electric arc welding equipment shall be installed and maintained in accordance with applicable provisions of the current NEC (National Electrical Code).

Grounding: Frames of all electric welding machines operated from power circuits shall be effectively grounded in accordance with current NEC standards. The ground for electric welding circuits shall be both mechanically and electrically adequate. Pipelines containing flammable gases or liquids, electrical conduits, chains, wire rope, cranes, hoists, or similar devices shall not be used for a ground.

Cables: Splices or repaired insulation shall not be permitted within 10 feet of the electrode holder. Cables shall be positioned so as not to create obstructions on walkways, scaffolds, stairs, or ladders.

Gasoline-driven arc welders: Gasoline-driven arc welders shall not be used in confined spaces, or underground in tunnels, shafts, conduits, etc.



INERT-GAS METAL ARC WELDING

Chlorinated solvents: Application of chlorinated solvents shall not be done within 200 feet of the exposed arc surfaces prepared with chlorinated solvents shall be thoroughly dry before welding is permitted on such surfaces.

Arc protection: Employees exposed to the arc shall be required to wear goggles with filter lenses. When two or more welders are exposed to each other's arc, filter lens goggles of suitable type shall be worn under the welding helmets. Hand shields designed to dissipate radiant energy shall be used when either the helmet is lifted or the shield is removed.

Radiation: Welders and persons exposed to radiation shall wear protective clothing completely covering the skin to prevent harmful effects of ultraviolet rays.



TITANIUM EXCAVATION

MATERIAL HANDLING & BACK INJURY PREVENTION

Purpose

Appropriate materials storage and handling can help reduce job-site accidents and worker injuries. It can also make the construction process much more productive.

One of the leading causes of construction worker fatalities is being “struck by” objects. The following basic materials handling and storage principles can help reduce “struck by” incidence.

Methods of Prevention

Whether moving materials manually or mechanically, Titanium Excavation employees shall be aware of the potential hazards associated with the task at hand and know how to exercise control over their workplaces to minimize danger.

Moving, Handling, and Storing Materials

When manually moving materials, Titanium Excavation employees shall seek help when a load is so bulky that it cannot be properly grasped or lifted, when they cannot see around or over it, or when load cannot be safely handled.

When a Titanium Excavation employee is placing blocks under raised loads, the employee shall ensure that the load is not released until their hands are clearly removed from the load. Blocking materials and timbers should be large and strong enough to support the load safely. Materials with evidence of cracks, rounded corners, splintered pieces, or dry rot shall not be used for blocking.



Handles and holders shall be attached to loads to reduce chances of getting fingers pinched or smashed. Workers shall also use appropriate protective equipment. For loads with sharp or rough edges, wear gloves or other hand and firearm protection. To avoid injuries to the hands and eyes, use gloves and eye protection. When loads are too heavy or bulky, each Titanium Excavation employee shall also wear steel-toed safety shoes or boots to prevent foot injuries if the worker slips or accidentally drops a load.

When mechanically moving materials, avoid overloading the equipment by letting the weight, size and shape of the materials being moved dictate the type of equipment used for transporting it. All materials handling equipment has rated capacities that determine the maximum weight the equipment can safely handle and the conditions under which it can handle those weights. The equipment-rated capacities must be displayed on each piece of equipment and must not be exceeded except for load testing.

Stored materials must not create a hazard. Storage areas must be kept free from accumulated materials that may cause tripping, fires or explosions or that may contribute to the harboring of rats and other pests. When stacking and piling materials, it is important to be aware of such factors as the materials' height and weight, how accessible the stored materials are to the user, and the condition of the containers where the materials are being stored.

All bound material should be stacked, placed on racks, blocked, interlocked, or otherwise secured to prevent it from sliding, falling or collapsing. A load greater than that approved by a building official may not be placed on any floor of a building or other structure. Where applicable, load limits approved by the building inspector should be conspicuously posted in all storage areas.

When stacking materials, height limitations should be observed. For example, lumber must be stacked no more than 16 feet high if it is handled manually; 20 feet is the maximum stacking height if a forklift is used. For quick reference, walls or posts may be painted with stripes to indicate maximum stacking heights.



Used lumber must have all nails removed before stacking. Lumber must be stacked and leveled on solidly supported bracing. The stacks must be stable and self-supporting. Stacks of loose bricks should not be more than 7 feet in height. When masonry blocks are stacked higher than 6 feet, the stacks should be tapered back one-half block for each tier above the 6-foot level.

Bags and bundles must be stacked in interlocking rows to remain secure. Bagged material must be stacked by stepping back the layers and cross-keying the bags at least every ten layers. To remove bags from the stack, start from the top row first. Baled paper and rags stored inside a building must not be closer than 18 inches to the walls, partitions, or sprinkler heads. Boxed materials must be banded or held in place using cross-toes or shrink plastic fiber.

Drums, barrels and kegs must be stacked symmetrically. If stored on their sides, the bottom tiers must be blocked to keep them from rolling. When stacked on end, put plank, sheets of plywood dunnage or pallets between each tier to make a firm, flat, stacking surface. When stacking materials two or more feet high, the bottom tier must be chocked on each side to prevent shifting in either direction.

When stacking, consider the need for availability of the material. Material that cannot be stacked due to size, shape or fragility can be safely stored on shelves or in bins. Structural steel, bar stock, poles, and other cylindrical materials, unless in racks, must be stacked and blocked to prevent spreading or tilting. Pipes and bars should not be stored in racks that face main aisles; this could create a hazard to passers-by when supplies are being removed.



Back Injury Prevention

Back injury prevention training is necessary because of the following facts:

- The majority of back injuries occur when picking up less than one pound
- Eight out of ten Americans will eventually suffer a back injury
- Once a back injury occurs, a future incident is three to four times more likely
- When you bend at the waist to pick up 100 pounds, $\frac{3}{4}$ ton of force is exerted on the lower back
- Some back injuries occur during slips, trips and falls

The number one cause of back injury is “improper lifting.” Some of the types of injuries resulting from improper lifting are:

- Sprains and/or strains – weak muscles are stretched and torn by poor posture and aggravated by improper lifting, twisting and bending
- Disk problems – slipped disks, contusions and ruptures cause spinal cord damage, numbness or pain
- Fractured vertebrae – usually the result of a fall

Improper lifting can be responsible for causing painful, and sometimes permanent, damage to your back. Listed below is the simple structure of the human back.

1. **Cervical Curve** – The neck, consists of eight vertebrae which allow head movement
2. **Thoracic Curve** – The middle back, consists of 12 vertebrae with little mobility
3. **Lumbar Curve** – The lower back, consists of five vertebrae which hold most body weight
4. **Sacrum Curve** – The base of the spine, consists of five vertebrae
5. **Coccyx** – The tail bone, consists of four fused vertebrae



Some of the items to avoid when safe-guarding your back are:

- Bending the back, bend at knees
- Twisting the back, move feet
- Extending or reaching to lift, slide load toward you or get help
- Walking on wet surfaces
- Excessive twisting or straining of your back while attempting to move in areas such as restricted areas or some confined spaces

One of the best methods for preventing back injury is to follow the APL system as follows:

1. Assess the load – path, look for obstructions, doors, extension cords; load size, is it too large or too awkward
2. Position yourself – feet, get close to the load; grip and get the load close to your body; balance the load
3. Lift the load – bend at knees and lift with legs

Another back injury prevention system that has become very commonplace, is the practice of “Ergonomics.” Following are some examples of applied “Ergonomics:”

- Use a table, box or bench whenever possible to avoid bending over for long periods of time
- Change your position frequently by stretching, standing, bending or sitting
- Avoid bending or twisting your back, use your knees to bend, pivot your feet to twist
- Position items in the work area no lower than 15 inches and no higher than 55 inches to avoid extending or reaching when lifting; slide the object toward you or get assistance
- Avoid storing heavy objects above or below waist height
- Avoid lifting things you cannot see over



TITANIUM EXCAVATION

CELL PHONE POLICY

It is important to maintain a professional and safe environment for all employees. The use of cell phones while working with ladders, tools, and heavy equipment is unsafe and distracting. Personal cell phone use will be restricted to break and lunch time. Keep your cell phone in your lunch box or your vehicle. Should any family emergencies arise, inform your family that they may contact the Titanium Excavation office to relay the message to you. Supervisors have been issued company cell phones and the message will be relayed to you. Encourage family to contact you through the office in the event of emergencies. Only emergencies will be relayed to your supervisor. All other issues need to be directed to your personal cell phone and you can take care of these things during your break. If your supervisor feels that personal cell phones are a problem at the job, they may request you to leave your cell at home. Violating this policy could result in a written warning and/or termination.



TITANIUM EXCAVATION

ALCOHOL AND DRUG ABUSE POLICY

In striving to maintain a safe, healthful and productive work environment Titanium Excavation recognizes that it is not immune from the nationwide societal problem of alcohol and drug abuse. In order to limit the impact of alcohol and drug abuse on the company's workplace and employees, Titanium Excavation has adopted this Alcohol and Drug Abuse Policy

Titanium Excavation prohibits and will take disciplinary action up to and including discharge for the following:

1. The unauthorized use, possession, manufacturing, distribution, dispensation or sale of alcohol, drugs or drug paraphernalia on company premises, in company-supplied vehicles, or in any location while on company business. For the purpose of the Policy, "drugs" include marijuana, cocaine, opiates, PCP, amphetamines and any other controlled substances. Unauthorized possession includes possession on an employee's person, as well as storage in a locker, desk, company or personal vehicle, or any other repository on company premises or while on company business.
2. Performing any job duties under the influence of alcohol or drugs on company premises, in company-supplied vehicles, or in any location while on company business. An employee will be considered to be "under the influence" of alcohol or drugs if he or she exhibits recognizable symptoms of alcohol or drug abuse, including, but not limited to, slurred or inappropriate speech, dazed appearance, uneven gait, altered attention span, other symptoms or tests positive for the presence of alcohol or drugs.
3. The possession, use, manufacturing, distribution, dispensation or sale of alcohol or drugs off company premises that may adversely affect the individual's work performance, his or her own or other's safety at work or the company's reputation in the community.



4. Refusal or failure to follow reasonable instructions issued by a supervisor implementing this Policy.

Disciplinary action may also be imposed for the following:

1. Conviction under any criminal drug statute for a violation occurring in the workplace or in another location while on company business;
2. Conviction under any criminal drug statute under circumstances which adversely affect the company's reputation in the community;
3. Failure to notify the company of any conviction under any criminal drug statute within five days of the conviction.

Testing Policy

In connection with this policy, Titanium Excavation has instituted a program to identify employees whose alcohol and drug abuse problems may affect the workplace and to prevent new employees from bringing their substance abuse problems to the workplace.

For-Cause Testing

Whenever a supervisor believes that an employee's performance or workplace behavior may have been affected in any manner by alcohol or drug abuse, Titanium Excavation may require that the employee submit a urine sample for drug testing and/or a breath or blood sample for alcohol testing. Any employee who tests positive will be considered in violation of this policy and may face discipline up to and including immediate termination.

Titanium Excavation will utilize one or more certified alcohol or drug testing laboratories and collections sites to assure accurate and reliable results. At the applicant/employee's request and expense, a positive drug test result may be validated by retesting, at the same laboratory or a second testing laboratory, using the same sample.

Post Accident Testing

Any employee who is involved in a work related accident (as defined below) will be tested for the use of illegal drugs and alcohol as soon as possible after the accident.



Examples of an accident that will require an employee to take a drug and alcohol test include, but are not limited to, accidents that involve an employee and result in:

1. The death of a person.
2. Bodily injury to another person who requires medical treatment away from the scene of the accident.
3. An injury to the employee that may result in that employee filing a workers compensation claim and whose lost time will likely exceed one working day; or,
4. Damage to property owned by the company or a third party that may reasonably be estimated to exceed \$500.

An employee who is seriously injured and cannot provide a specimen for testing will be required to authorize the release of relevant hospital reports or other documentation that would indicate whether there were drugs or alcohol in their system at the time of the accident.

If it is determined by management that an employee's injury was definitely caused by an unsafe condition and that there was no unsafe act by the injured employee, the company reserves the right to waive post accident testing under these circumstances.

Employees who are involved in a work related accident requiring medical attention are to inform their supervisor of the accident as soon as possible so that any needed drug or alcohol test may be promptly conducted in conjunction with their medical treatment.

Policy on Use of Prescription Drugs

Employees may possess and take medication prescribed for them by a licensed physician in accordance with the prescription. However, an employee taking any medication which may impair his or her physical or mental ability at work must report this fact to Titanium Excavation, which, in its sole discretion, will determine whether and for how long the employee's job assignment should be changed. Employees should keep all prescribed medicine in its original container which is labeled with drug identity, date of prescription and name of doctor. Improper use of medication obtained through a prescription is a violation of this policy



Search Policy

1. In order to enforce the prohibition against illegal activity on company premises, Titanium Excavation retains the right to inspect, without prior notice including the employee's work area, desk, tool box, locker, Titanium Excavation vehicle, or other company property in the custody or control of the employee, as well as the employee's personal effects on company property, including personal vehicles. In addition, the company has the right to restrict or deny any employee access to any part of the company's premises at any time, without prior notice. Refusal to permit an inspection is a violation of this Policy, and may result in discipline up to and including termination.



OSHA 1926 Standards (Construction)

[1926 Subpart A - General](#)

[1926 Subpart B - General Interpretations](#)

[1926 Subpart C - General Safety and Health Provisions](#)

[1926 Subpart D - Occupational Health and Environmental Controls](#)

[1926 Subpart E - Personal Protective and Life Saving Equipment](#)

[1926 Subpart F - Fire Protection and Prevention](#)

[1926 Subpart G - Signs, Signals, and Barricades](#)

[1926 Subpart H - Materials Handling, Storage, Use, and Disposal](#)

[1926 Subpart I - Tools - Hand and Power](#)

[1926 Subpart J - Welding and Cutting](#)

[1926 Subpart K - Electrical](#)

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[1926 Subpart M - Fall Protection](#)

[1926 Subpart N - Cranes, Derricks, Hoists, Elevators, and Conveyors](#)

[1926 Subpart O - Motor Vehicles, Mechanized Equipment, and Marine Operations](#)

[1926 Subpart P - Excavations](#)

[1926 Subpart Q - Concrete and Masonry Construction](#)

[1926 Subpart R - Steel Erection](#)

[1926 Subpart S - Underground Construction, Caissons, Cofferdams, and Compressed Air](#)

[1926 Subpart T - Demolition](#)

[1926 Subpart U - Blasting and the Use of Explosives](#)

[1926 Subpart V - Power Transmission and Distribution](#)

[1926 Subpart W - Rollover Protective Structures; Overhead Protection](#)

[1926 Subpart X - Ladders](#)

[1926 Subpart Y - Commercial Diving Operations](#)

[1926 Subpart Z - Toxic and Hazardous Substances](#)

