(e) Do not cut openings in a floor for the disposal of materials longer in size than 25% of the aggregate of the total floor area unless the lateral supports of the removed flooring remain in place. Shore floors weakened or otherwise made unsafe by demolition to carry safely the intended imposed load for demolition.

(10) Remove all demolition debris and other existing wastes within the limits of work and dispose offsite according to the Waste Management Plan (see para 17-7). Separate the debris according to the planned disposal type. Dispose of all material to include ACM and ORM according to applicable laws and regulations.

(11) The USACE supervisor will approve or the KO or COR will accept the disposal sites, whether Government furnished, private, or commercial, during review of the Waste Management Plan. Provide the USACE supervisor/KO or COR with documentation that confirms the actual disposal locations, the type of debris, and quantities of each type to include any wastewater generated during dust suppression.

(12) Transport lead, ACM and ORM to a controlled landfill or other licensed disposal facility.

(13) Transport construction and demolition (C&D) debris to a solid waste landfill.

(14) Transport recyclable C&D materials to a recycle yard or set them aside for Government use.

17-9. Figures and Tables.
Not Applicable.

17-10. Checklists and Forms.
Not Applicable.

Chapter 18
Vehicles, Machinery, and Mechanized Equipment

18-1. References.

a. ANSI/Industrial Truck Standards Development Foundation (ITSDF) B56.1, Safety Standard for Low Lift and High Lift Trucks (https://webstore.ansi.org/) (18-1.a)

b. SAE J1042, Operator Protection for General-Purpose Industrial Machines (https://www.sae.org/standards/) (18-1.b)

c. SAE J167, Overhead Protection for Agricultural Tractors- Test Procedures and Performance Requirements (https://www.sae.org/standards/) (18-1.c)

d. SAE J386, Operator Restraint System for Off-Road Work Machines (https://www.sae.org/standards/) (18-1.d)

e. SAE J1194, Rollover Protective Structures (ROPS) for Wheeled Agricultural Tractors (https://www.sae.org/standards/) (18-1.e)

f. 29 CFR 1910.178, Powered Industrial Trucks (https://www.govinfo.gov/content/pkg/CFR-2020-title29-vol5/pdf/CFR-2020-title29-vol5-sec1910-178.pdf) (18-1.f)

g. 49 CFR 571, Federal Motor Vehicle Safety Standards (https://www.govinfo.gov/content/pkg/CFR-2020-title49-vol6/pdf/CFR-2020-title49-vol6-part571.pdf) (18-1.g)

18-2. Definitions.

a. All-Terrain Vehicle (ATV). Recreational-type vehicles intended for off-road use that travel on four low pressure tires with a seat designed to be straddled by the operator. (18-2.a)

b. Drilling Equipment. Mechanized equipment used for boring into rock, soil, or concrete. (18-2.b)

c. Government-Owned Motor Vehicle. Any motor vehicle that is government owned or leased by USACE (for example, General Services Administration fleet vehicles). Personally owned vehicles or temporary duty rental cars being used while on-duty to transport Government employees for official business. (18-2.c)

d. Machinery and Mechanized Equipment. Mobile, stationary, self-propelled, or towed equipment intended for use on construction sites or industrial sites. This equipment is not intended for operation on public highways. (18-2.d)

e. Motorcycle. A motor vehicle with motive power having a seat or saddle for the use of the rider and designed to travel on not more than three wheels in contact with the ground. (18-2.e)

f. Motor Vehicle. A sedan, van, sport utility vehicle, truck, motorcycle, or other mode of conveyance intended for use on public roadways. This includes construction equipment that is driven on public highways. (18-2.f)

g. Snow Machine. Any vehicle designed to travel over ice and snow using mechanical propulsion in conjunction with skis, belts, cleats, or low-pressure tires. (18-2.g)

h. Specialty Vehicle. All other vehicles not meeting any of the vehicle, machine, or equipment definitions in this chapter and may include cargo or personnel carriers or custom. (18-2.h)

i. Utility-Terrain Vehicle (UTV). Vehicles designed to perform off-road utility tasks such as passenger and cargo transportation with side-by-side seating. (18-2.i)

18-3. Personnel Required Qualification/Training.

a. Every person operating machinery and mechanized equipment, drilling equipment, ATVs, UTVs, or specialty vehicles must be properly trained, qualified by license, certificate, or permit, and designated by the employer in writing to operate such equipment. (18-3.a)

b. Every operator of a motor vehicle, machinery and mechanized equipment, drilling equipment, ATV, UTVs, or specialty vehicles, must possess, at all times while operating such vehicle or equipment, a current, non-expired license or permit (proof of qualification) valid for the equipment being operated. Licensing requirements are specified in the applicable Service regulation for military personnel and state regulations for civilian personnel, to include contractors. The operator must present the license or permit to the USACE supervisor/KO or COR upon request. Failure to do so will result in the immediate prohibition of the operator to operate the vehicle, machinery, or equipment. (18-3.b)

(1) USACE Operators. In lieu of a license or permit for each piece of equipment, a DA Form 348 (Equipment Operator's Qualification Record (Except Aircraft)) (see para 18-10.a), or similar type of documentation, may be maintained on file at the employee's project office for all USACE equipment operators.

(2) Government Personnel Operators. Follow local installation requirements. They may require OF 346 (U.S. Government Motor Vehicle Operator's Identification Card) (see para 18-10.b), on military bases in addition or in lieu of a state driver's license.

c. Every operator of a motor vehicle, machinery and mechanized equipment, drilling equipment, ATV, UTVs, or specialty vehicles must be able to read and understand the signs, signals, and operating instructions in use. (18-3.c)

d. Defensive Driving. The principles of defensive driving must be practiced. Government and contractor operators of government motor vehicles (see para 18-2.c) must complete four hours of defensive driver training in every four-year period. Training must include an initial training with a minimum duration of 2 hours. Contractor operators of government-owned motor vehicles must provide documentation of completion of a defensive driving course meeting this requirement to the local SOHO/USACE supervisor/KO or COR initially and upon request. (18-3.d)

e. Machinery and Mechanized Equipment. Equipment operators must be trained and evaluated by persons who have the applicable and appropriate knowledge training and experience. (18-3.e)

(1) Examiners must be independently certified (that is, they cannot train and evaluate themselves).

(2) All qualification/licensing of equipment operators by examiners must include, at a minimum, the requirements of this chapter, the manufacturer's instructions and recommendations, as well as observation of a practical operating examination on the equipment.

f. Powered Industrial Trucks (PITs). Train operators according to 29 CFR 1910.178, including both classroom and practical operation. Employees must be trained on the same type of truck they will be expected to use on the job. (18-3.f)

(1) The employer must certify that the operator has been trained and evaluated as required by the standard. The certification must include the name of the operator, the date of the training, the date of the evaluation, and the identity of the person(s) performing the training or evaluation.

(2) Refresher training in relevant topics must be conducted at least once every three years, including an evaluation of each PIT operator's performance. In addition, refresher training must be provided when any of the following conditions exist:

(a) The operator has been observed to operate the vehicle in an unsafe manner.

(b) The operator has been involved in an accident or near miss.

(c) The operator has received an evaluation that reveals that the operator is not operating the PIT safely.

(d) The operator is assigned to drive a different type of PIT.

(e) A condition in the workplace changes in a manner that could affect safe operation of the PIT.

g. All-Terrain Vehicles (ATVs). Operators must complete an accredited ATV training course (for example, Specialty Vehicles Institute of America, by in-house resources that have been certified as trainers by an accredited organization) prior to operation of the vehicle. (18-3.g)

Note. If in-house trainers are used, they must be certified by an accredited organization. They must perform at least one training session every three years to maintain certification. If the accrediting agency requires the trainer to return for

refresher training to maintain certification, this requirement is in addition to the training session taught every three years.

h. Utility-Terrain Vehicles (UTVs). Operators must be familiar with the use of all controls and understand proper moving, stopping, turning, and other operating characteristics of the vehicle. Operators must review all training materials provided by the manufacturer and be trained according to the manufacturer's instructions to include the following: (18-3.h)

(1) Basic riding tips from the manufacturer's published literature for each vehicle.

(2) Reading terrain.

(3) Climbing hilly terrain.

(4) Descending a hill.

(5) Traversing a slope.

(6) Riding through water.

(7) Cargo carriers and accessories.

(8) Loading and unloading.

(9) Troubleshooting.

(10) Proper preventative maintenance (for example, oil levels, tire pressure requirements, and scheduled maintenance requirements according to the manufacturer's guidelines).

i. Specialty Vehicles. Establish a driver qualification and training program specific to each specialty vehicle. (18-3.i)

j. Snow Machines. Operators of snow machines must be trained in the following: (18-3.j)

(1) Hand signals.

(2) Riding positions.

(3) Towing of a sled.

(4) Surface conditions and types (for example, snow, ice, tundra).

(5) Proper riding apparel.

(6) Dangers to avoid.

18-4. Roles and Responsibilities.

a. Competent Person (CP). (18-4.a)

(1) Inspect vehicles and machinery and mechanized equipment according to the manufacturer's requirements and this manual (see para 21-5.b).

(2) Conduct and document required risk assessments for drilling operations (see para 18-8.k).

b. Vehicle and Equipment Operators. Conduct pre-use inspections (see para 18-5.a). (18-4.b)

c. Qualified Person (QP). (18-4.c)

(1) Test, maintain, and repair vehicles and machinery and mechanized equipment according to the manufacturer's instructions (see paras 18-5.a and 18-8.a).

(2) Evaluate all equipment placed or operating on barges, pontoons, vessels, or other means of floatation for safe placement, transport, and operating conditions (see para 18-8.j).

d. Qualified Mechanic. Inspect vehicles and machinery and mechanized equipment prior to initial use (see para 21-5.a). (18-4.d)

18-5. Inspection Requirements.

a. General Inspections. (18-5.a)

(1) Inspect, test, maintain, and repair all vehicles and machinery and equipment under a scheduled maintenance program according to the manufacturer's instructions. Maintenance programs must be conducted by a QP.

(2) A qualified mechanic (as required by the equipment manufacturer) must inspect all vehicles and machinery and mechanized equipment not otherwise inspected by state or local authorities before initial use. The items must be in a safe operating condition and in compliance with all required published vehicle safety standards. Maintain this one-time inspection report available at the work site.

(3) Inspect dump trucks brought onto USACE job and project sites. The dump trucks must be in compliance with the requirements of paragraph 18-8.h before they are placed in service and document this inspection.

(4) Prior to each use, but not more often than once each day or each shift, vehicles and machinery and mechanized equipment must be checked by the operator to assure that the following parts, equipment, and accessories are in safe operating condition and free of apparent damage that could cause failure while in use:

(a) Service brakes, including trailer brake connections.

(b) Parking system (hand brake).

(c) Emergency stopping system.

(d) Tires.

(e) Horns.

(f) Steering mechanism.

(g) Coupling devices.

(h) Seat belts.

(i) Operating controls.

(j) Safety devices (for example, back-up alarms and lights, fire extinguishers, first-aid kits).

(k) Accessories including lights, reflectors, windshield wipers, and defrosters where such equipment is necessary.

(5) Maintain inspection, test, repair, and maintenance records at the site and make them available, on request, to the USACE supervisor/KO or COR.

b. Machinery and Mechanized Equipment. (18-5.b)

(1) Prior to being placed into use, machinery and mechanized equipment must be inspected by a CP. Inspections must be documented on either a manufacturer, government-supplied, or contractor generated checklist, and signed by the CP designating that the equipment meets the manufacturer’s recommendations and the requirements of this manual.

(a) Submit the checklist to the USACE supervisor/KO or COR upon completion of an inspection and include it in the project file.

(b) Correct all safety deficiencies noted during the inspection prior to placing the equipment back in service.

(c) Conduct subsequent re-inspections at least annually. Any time the machinery or mechanized equipment is removed and subsequently returned to the project (other than equipment removed for routine off-site operations as part of the project), it must be re-inspected and recertified prior to use.

(d) Contractors must provide the KO or COR ample notice in advance of any equipment entering the site so that the contractor's inspection process may be observed and spot checks may be conducted.

(2) Inspect all machinery and mechanized equipment daily (when in use) to ensure safe operating conditions. Inspections must be conducted by a CP and documented to include, the date, name of the inspector, specific items inspected, and a "PASS/FAIL" indication. Provide copies of the inspections to the USACE supervisor/KO or COR upon request.

c. Road and Shoulders. Perform inspections or determinations of road and shoulder conditions and structures in advance to assure clearances and load capacities are safe for the passage or placing of any machinery and mechanized equipment. (18-5.c)

18-6. Activity Hazard Analysis (AHA) Requirements.
Develop AHAs according to paragraphs 1-6 or 2-6, as applicable, to include the following:

a. Drilling Equipment. Develop an AHA prior to initiating rock, soil, or concrete drilling operations. The AHA must include: (18-6.a)

(1) Location of all overhead electrical lines/hazards.

(2) Location of any possible UXO or hazardous agents in the soil.

(3) Location of utilities both above and below grade.

(4) Designated areas for equipment operations and material storage.

(5) Assembly and disassembly sequences for the drilling equipment.

(6) Operation of the drilling equipment and handling of associated materials.

(7) If available, a geotechnical survey report identifying subsurface and surface ground condition.

(8) A hard copy of the SDS for any drilling fluids (see chapter 6).

(9) Risk assessments according to paragraph 18-8.k when applicable.

b. Specialty Vehicles. Develop an AHA prior to use. The AHA must include: (18-6.b)

(1) The safe operations.

(2) Limits of operational work areas.

(3) Required PPE.

(4) Vehicle safety equipment requirements for each specialty vehicle.

c. Remote Operated Heavy Equipment and Machinery. Develop an AHA for the intended operations for all heavy equipment and machinery operated by remote control not otherwise specified elsewhere in this manual. The AHA must include: (18-6.c)

(1) A process for notifying affected personnel that a remote vehicle is operating in the work area.

(2) Potential locations of utility interference.

(3) Location and process for emergency shut off.

(4) Potential radiation hazards for equipment or material being managed.

(5) Personnel qualified to operate the equipment (see para 18-3).

(6) Process for retrieving lost equipment.

(7) Process for handling equipment that has lost control.

d. Floating Equipment. A QP must evaluate all equipment placed or operating on barges, pontoons, vessels, or other means of floatation for safe placement, transport, and operating conditions according to paragraph 18-8.j. The evaluation must be documented and included in the AHA for approval by the USACE supervisor or acceptance by the KO or COR prior to the commencement of work. (18-6.d)

e. Risk Assessments. Risk assessments according to paragraph 18-8.b when applicable. (18-6.e)

18-7. Minimum Plan Requirements.
Not Applicable.

18-8. General Requirements.
The requirements in this paragraph apply to the operation of motor vehicles, machinery and mechanized equipment, drilling equipment, ATVs, UTVs, and other specialty

vehicles. Operators of these items must also comply with state and host nation regulations as applicable to the above listed equipment.

a. Tests, Maintenance, and Repairs. (18-8.a)

(1) Tests, maintenance, and repairs must be conducted by a QP according to the manufacturer's instructions. All tests, maintenance, and repairs must be documented. (See para 18-5)

(a) For contract operations, keep records of maintenance and repairs conducted during the life of the contract available upon request of the KO or COR.

(b) For USACE operations, keep records of maintenance and repair for the duration of ownership.

(2) Whenever any motor vehicles, machinery and mechanized equipment, drilling equipment, ATVs, UTVs, or other specialty vehicles are found to be unsafe, or whenever a deficiency that affects the safe operation is observed, the equipment must immediately be taken out of service and its use prohibited until unsafe conditions have been corrected.

(a) Place a tag indicating the equipment must not be operated in a conspicuous location on the equipment. Where required, follow LOTO procedures. (See chapter 12).

(b) Tags must remain in place until removed by a QP after corrections are complete and the equipment has been retested and reinspected.

b. Guarding and Safety Devices. Do not remove guards, safety appliances, or devices from vehicles or machinery and mechanized equipment, or make them ineffective, except for when making immediate repairs, lubrications, or adjustments, and then only after the equipment has been de-energized and HECP LOTO procedures are implemented. Immediately replace all guards and devices upon completion of repairs and adjustments and before the item is released from LOTO. (See chapter 12) (18-8.b)

(1) Reverse Signal (back-up) Alarm. All self-propelled construction and industrial equipment, dump trucks, and cargo trucks, whose trailer or body permanently block the view to the rear, whether moving alone or in combination, must be equipped with a back-up alarm.

Note. Equipment designed and operated so that the operator is always facing the direction of motion does not require a back-up alarm.

Note. Commercial cargo vehicles such as pick-up trucks, utility cargo/tool trucks, and flat-bed cargo trucks intended for use on public highways with a normally clear view through the rear window are not required to have back-up alarms. If the rear view is

temporarily obstructed by a load or permanently blocked by a utility/toolbox or other modification, then a signal person may be used, if the value outweighs the risk to the signal person. In lieu of a signal person, a back-up alarm must be installed.

(a) Back-up alarms must be audible and sufficiently distinct to be heard above the surrounding noise level.

(b) Alarms must operate automatically upon commencement of backward motion. Alarms may be continuous or intermittent (not to exceed 3-second intervals) and must operate during the entire backward movement.

(c) Do not remove or disable any back-up alarms.

(2) Warning Devices. Provide a warning device where there is danger to persons from moving equipment, swinging loads, buckets, booms, or similar. A signal person may be used in lieu of a warning device if the value outweighs the risk to the signal person.

(3) Guarding. Guard all belts, gears, shafts, pulleys, sprockets, spindles, drums, flywheels, chains, or other reciprocating, rotating, or moving parts of equipment when exposed to contact by persons or when they otherwise create a hazard.

(a) Guard or insulate all hot surfaces of equipment, including exhaust pipes or other lines to prevent injury or fire.

(b) All points requiring lubrication during operation must have fittings so located or guarded to be accessible without hazardous exposure.

(4) Design, construct, and install platforms, foot walks, steps, handholds, guardrails, and toe boards on machinery and mechanized equipment to provide safe footing and access ways.

(5) Provide machinery and mechanized equipment with suitable working surfaces of platforms, guardrails, and hand grabs when attendants or other employees are required to ride for operating purposes outside the operator's cab or compartment. Platforms and steps must be of nonskid material.

(6) Provide substantial overhead protection for the operators of forklifts and similar material handling equipment (see para 18-8.i).

(7) Brake Systems. Equip all vehicles, except trailers having a gross weight of 5,000 lbs. (2,268 kg) or less, with service brakes and manually operated parking brakes.

(a) Service and parking brakes must be adequate to control the movement of, to stop, and to hold the vehicle under all conditions of service.

(b) The braking systems on every combination of vehicles must be in approximate synchronization on all wheels and develop the required braking effort on the rear-most wheels first. The brake system must be configured so that the brakes are applied from the prime mover driver's seat. Exceptions to this are vehicles in tow by an approved tow bar hitch according to applicable federal, state, or local requirements.

(8) Locate fuel tanks so that spills or overflows will not run onto engine, exhaust, or electrical equipment.

(9) Direct exhaust or discharges from equipment so that they do not endanger persons or obstruct the view of the operator.

(10) Use a safety tire rack, cage, or equivalent protection when inflating, mounting, or dismounting tires installed on split rims, or rims equipped with locking rings or similar devices.

(11) Seat Belts. All occupants of motor vehicles must wear seat belts. The seat belt assemblies and anchorages must comply with 49 CFR 571. Installation and use on buses is optional.

(a) Two-piece seat belts and anchorages for construction equipment must comply with applicable federal specifications or SAE J386.

(b) All construction equipment equipped with seat belts must have the seat belts worn by the operator, unless specified otherwise in the manufacturer's operating manual and justified in an AHA and approved in writing by the USACE supervisor or accepted by the KO or COR.

(12) All high-lift PITs must be equipped with overhead guards that meet the structural requirements defined in ANSI/ITSDF B56.1.

(13) Provide suitable protection against the elements, falling or flying objects, swinging loads, and similar hazards for operators of all machinery and mechanized equipment. Glass used in windshields or cabs must be safety glass.

(14) Falling Object Protective Structures (FOPS). Provide all bulldozers, tractors, or similar equipment used in clearing operations with guards, canopies, or grills to protect the operator from falling and flying objects as appropriate to the nature of the clearing operations.

(a) Furnish FOPS for other construction, industrial, and grounds-keeping equipment when the operator is exposed to falling object hazards.

(b) FOPS must be certified by the manufacturer or a licensed engineer.

(15) Rollover Protective Structures (ROPS).

(a) In addition to the requirements of paragraph 18-8.b, ROPS must be installed on:

(a-1) Crawler and rubber-tire tractors including dozers, push and pull tractors, winch tractors, and mowers.

(a-2) Off-the-highway self-propelled pneumatic-tire earth movers (for example, trucks, pans, scrapers, bottom dumps, and end dumps).

(a-3) Motor graders.

(a-4) Water tank trucks having a tank height less than the cab.

(a-5) Other self-propelled construction equipment such as front-end loaders, backhoes, rollers, and compactors.

(b) ROPS are not required on:

(b-1) Trucks designed for hauling on public highways.

(b-2) Crane-mounted dragline backhoes.

(b-3) Sections of rollers and compactors of the tandem, steel-wheeled, and self-propelled pneumatic-tired type that do not have an operator's station.

(b-4) Self-propelled, rubber-tired lawn and garden tractors and side-boom pipe laying tractors operated solely on flat terrain (maximum 10-degree slope; 20-degree slope permitted when off-loading from a truck) not exposed to rollover hazards.

(b-5) Cranes, draglines, or equipment on which the operator's cab and boom rotate as a unit.

(c) ROPS may be removed from certain types of equipment when the work cannot be performed with the ROPS in place and when ROPS removal is justified and delineated in an AHA and approved in writing by the USACE supervisor or accepted by the KO or COR.

(d) The operating authority must furnish proof from the manufacturer or certification from an RPE that the ROPS complies with applicable SAE Standards (that is, J167, J1042, J1194). ROPS are also considered acceptable if they meet the criteria of any state that has a Department of Labor-approved OSHA program or meets Water and Power Resources Service requirements.

(16) All machinery and mechanized equipment and material hoists operating on rails, tracks, or trolleys must have positive stops or limiting devices either on the equipment, rails, tracks, or trolleys to prevent overrunning safe limits.

(17) Under the following circumstances, long-bed end-dump trailers used in off-road hauling must be equipped with a rollover warning device. The device must have a continuous monitoring display at the operator station to give the operator a quick and easily read indicator and audible warning of an unsafe condition:

(a) The material being dumped is subject to being stuck or caught in the trailer rather than exiting the bed freely.

(b) The dumpsite cannot be maintained in a nominally level condition (that is, lateral slope less than 1^{o}- 2^{o}).

Note. If a rollover warning device is unavailable, a CP must perform a risk assessment and document the findings in the AHA as to why this requirement is not practical. Identify appropriate precautions and/or controls to ensure an equal level of safety is being accomplished.

(18) Vehicle Lighting. Equip vehicles or combinations of vehicles with the following equipment, except motorcycles and specialty vehicles, whenever visibility conditions warrant additional light:

(a) Two headlights, one on each side in the front.

(b) At least two red taillights, one on each side of the rear.

(c) Directional signal lights (both front and back).

(d) Three emergency flares or visible emergency warning lights or equivalent portable warning device.

c. Operating Rules. (18-8.c)

(1) Do not get off or on any motor vehicles, machinery and mechanized equipment, ATV's, UTV's and other specialty vehicles while they are in motion.

(2) Do not use cellular telephones when operating a government-owned motor vehicle. Hands-free devices only may be used.

(a) Prior to using a hand-held cellular phone, find a safe place to bring the vehicle to a stop.

(b) Text messaging by the operator is strictly prohibited while operating motor vehicles.

(3) Do not use any other portable headphones, earphones, or other listening devices (except for hands–free devices) while operating a government-owned motor vehicle.

(4) Do not eat, drink alcohol, or smoke while the vehicle is in motion.

(5) Global Positioning System (GPS).

(a) Mount the GPS so that it does not create sight hazards for the operator. A non-mounted GPS may only be used by the vehicle operator while the vehicle is in a stopped position.

(b) Do not program the GPS while the vehicle is in motion.

(6) Never exceed speeds greater than the posted speed limit. Reduce speeds when road conditions reduce the ability to maintain control of the vehicle or stop within a safe distance.

(7) Headlights must be on during fog, smoke, rain, from sunset to sunrise, and at any other time when there is not sufficient light for the vehicle to be seen or the operator to see on the highway at a distance of 500 feet (152.4 m), unless local regulations prohibit.

(8) Do not drive motor vehicles on a downgrade with gears in neutral or clutch disengaged.

(9) Railroad Crossings and Drawbridges.

(a) Upon approaching a railroad crossing or drawbridge, slow vehicle speeds to permit stopping before reaching the nearest track or the edge of the draw bridge and proceed only if the course is clear.

(b) Vehicles transporting 15 or more persons, explosives, or flammable or toxic substances must stop at railroad crossings and drawbridges and must not proceed until the course is clear, except at a railroad crossing or drawbridge protected by a traffic officer or a traffic signal giving a positive indication for approaching vehicles to proceed.

(10) Do not stop, park, or leave standing vehicles on any road in a position that would endanger the occupants, the vehicle, personnel in the area, or other vehicles. Ascertain a safe exit path before exiting vehicle.

(11) Do not leave vehicles unattended until the motor has been shut off, the key removed (unless local regulations prohibit), parking brake set (when applicable), and gear engaged in low, reverse, or park.

(12) Do not get between a towed vehicle and towing vehicle except when hooking or unhooking.

(13) Do not move vehicles or combination of vehicles hauling unusually heavy loads or equipment until the driver has been provided with the required permits, the correct weights of the vehicles and load, and a designated route to be followed according to this manual, applicable federal, state, or local requirements.

(14) When maneuvering or performing back-up operations, use a signal person when the point of operation (that is, area of load travel and area immediately surrounding the load placement) is not in full view of the operator, when vehicles are backed more than 100 feet (30.5 m), when terrain is hazardous, or when two or more vehicles are backing up in the same area. If a signal person or spotter is not used, operators must walk behind their vehicle to view the area for possible hazards before performing back-up operations with their vehicle. (See chapter 8)

(15) When vehicles or machinery and mechanized equipment are parked or disabled on a highway or the adjacent shoulder, use yellow flashing lights and other traffic warning devices (for example, cones, flags, signs) during the daytime and reflectors, flares, electric lights, or other effective means of identification at night.

(16) Loading Vehicles.

(a) Leave the cab while the vehicle is being loaded when exposed to danger from suspended loads or overhead loading equipment unless the cab is adequately protected.

(b) Do not load vehicles in a manner that obscures the driver's view ahead or to either side, or which interferes with the safe operation of the vehicle.

(c) Distribute, chock, tie down, and secure all loads. Cover the load when there is a hazard of flying or falling dirt, rock, debris, or other materials. Do not remove tail gates without first implementing a positive means to prevent the material from falling out of the back of the vehicle, and only as approved by the USACE supervisor or accepted by the KO or COR.

(d) When carrying loads that project beyond the front, sides or rear of the vehicle or trailers, attach a red flag, not less than 144 in^2 (929 cm^2), at or near the end of the projection. At night or when atmospheric conditions restrict visibility, use a warning light in lieu of the red flag. Ensure the load does not obscure vehicle lights and/or reflectors.

(17) Maintenance Vehicles. Equip all maintenance vehicles that are used at USACE recreational areas (or projects) with two 28 inches (71 cm) day glow/high-visibility orange traffic cones. When parked, place a cone in front and behind the vehicle, and remove and place in vehicle prior to departure.

d. Transportation of Personnel. (18-8.d)

(1) Do not exceed the number of passengers in passenger-type vehicles than the number that can be seated.

(2) Trucks used to transport personnel must be equipped with a securely anchored seating arrangement, a rear end gate, and guardrail. Provide steps or ladders for mounting and dismounting.

(3) Guard, stow, and secure all tools and equipment when transported with personnel.

(4) Do not ride with arms or legs outside of a vehicle body, in a standing position on the body, on running boards, or seated on side fenders, cabs, cab shields, bed of the truck, or on the load.

(5) Protect passengers from inclement weather elements. Enclose all vehicles transporting personnel during cold or inclement weather.

(6) Do not transport explosives, flammable materials (excepting normal fuel supply), or toxic substances within or on vehicles carrying personnel.

(7) Do not move vehicles transporting personnel until the driver has confirmed all persons are seated, and the guardrails and rear end gates are in place or doors are closed.

e. Motor Vehicles (for Public Roadway Use). (18-8.e)

(1) All motor vehicles for use on public roadways must be equipped with the following:

(a) An operable speedometer.

(b) An operable fuel gauge.

(c) An operable audible warning device (for example, horn).

(d) An adequate rearview mirror or mirrors.

(e) A power-operated starting device.

(f) A windshield equipped with an adequate windshield wiper.

(g) An operable defrosting and defogging device.

(h) Non-slip surfaces on steps.

(i) Cabs, cab shields, and other protection to protect the driver from the elements and falling or shifting materials.

Note. Motorcycles. Items (f) through (i) do not apply to motorcycles.

(2) Motor Vehicle Operators. Operators of motor vehicles, while on duty, must not operate vehicles for a continuous period of more than ten 10-hours in any 24-hour period; moreover, no employee, while on duty, may operate a motor vehicle after being in a duty status for more than 12-hours during any 24-hour period. A minimum of 8 consecutive hours of rest between shifts in a 24-hour period is required.

(3) Shut down all motor vehicles prior to and during fueling operations.

(4) Operators and passengers of motorcycles must always wear gloves, a DOT-approved motorcycle helmet with full face shield, visor or goggles, sturdy footwear, long sleeved shirt or jacket, long trousers, full fingered gloves, and high-visibility garments (bright color for day and retroreflective for night).

(5) Glass in windshields, windows, and doors must be safety glass. Replace any cracked or broken glass.

(6) Equip all buses, trucks, and combinations of vehicles with a carrying capacity of 1.5 tons (1,360.8 kg) or over that are operated on public highways with emergency equipment required by state laws, but not less than the following:

(a) One red flag not less than 144 in^2 (929 cm^2) and three reflective markers available for immediate use in case of emergency stops.

(b) Two-wheel chocks for each vehicle or each unit of a combination of vehicles.

(c) At least one 2A:10B:C fire extinguisher (see chapter 9).

(7) Equip all rubber-tired motor vehicles with fenders. Tires must not extend beyond fenders. Mud flaps may be used in lieu of fenders whenever motor vehicle equipment is not designed for fenders.

f. Trailers. (18-8.f)

(1) All towing devices used on any combinations of vehicles must be structurally adequate for the weight drawn and properly mounted.

(2) Provide a locking device or double safety system on every fifth-wheel mechanism and tow bar arrangement to prevent accidental separation.

(3) Couple trailers to the towing vehicle with safety chains or cables. The chains or cables must prevent the separation of the vehicles in case of tow bar failure.

(4) Provide a breakaway device for trailers equipped with power brakes. The breakaway device must effectively lock the brakes in the event the trailer separates from the towing vehicle.

g. Machinery and Mechanized Equipment. (18-8.g)

(1) Do not make modifications or additions that affect the capacity or safe operation of machinery or equipment without the manufacturer's written approval.

(a) If such modifications or changes are made, the capacity, operation, and maintenance instruction plates, tags, or decals must be changed accordingly.

(b) In no case may the original safety factor of the equipment be reduced.

(2) Do not operate machinery or equipment in a manner that will endanger persons or property.

(a) Do not exceed the safe operating speeds or loads.

(b) Operate machinery and equipment according to the manufacturer’s instructions and recommendations.

(c) Headphones may only be worn for communication directly related to operating the machine or mechanized equipment. Do not use headphones for entertainment purposes (for example, radio, CD, music, books) while operating equipment.

(d) Do not use cell phones or any other electronic device that may cause distractions while operating equipment.

(3) If the manufacturer’s instructions or recommendations are more stringent than the requirements of this manual, follow the more stringent requirements.

(4) All machinery and mechanized equipment must be equipped with the following:

(a) An operable fuel gauge.

(b) An operable audible warning device (for example, horn).

(c) Adequate rearview mirror or mirrors.

(d) Non-slip surfaces on steps.

(e) A power-operated starting device.

(f) A seat or equal protection for each person required to ride on equipment (unless standing is permitted by the equipment manufacturer).

(g) Powered wipers for all equipment with windshields. Equip vehicles that operate under conditions that cause fogging or frosting of windshields with operable defogging or defrosting devices.

(h) Glass in windshields, windows, and doors must be safety glass. Replace cracked or broken glass.

(5) Mobile equipment must have a service brake system and a parking brake system capable of stopping and holding the equipment while fully loaded on the grade of operation.

(6) Equipment Operators. Operators of machinery and mechanized equipment, will not be permitted to exceed 12-hours of duty time in any 24-hour period, including time worked at another occupation. A minimum of 8 consecutive hours of rest between shifts in a 24-hour period is required.

(7) Shut down mechanized equipment before and during fueling operations. Closed systems, with an automatic shut-off that will prevent spillage if connections are broken, may be used to fuel diesel powered equipment left running.

(8) Fully lower or block bulldozer and scraper blades, end-loader buckets, dump bodies, and similar equipment when being repaired or when not in use. All controls must be in a neutral position with the engines stopped and brakes set unless work being performed on the machine requires otherwise.

(9) Place stationary machinery and equipment on a firm foundation and secure it before operating.

(10) Adequately illuminate all mobile equipment and the areas in which they are operated while work is in progress (see chapter 7).

(11) Do not operate equipment powered by an internal combustion engine in or near an enclosed area unless adequate ventilation is provided to ensure the equipment does not generate a hazardous atmosphere.

(12) Display yellow flashing lights or four-way flashers visible from all directions on machinery or mechanized equipment parked on or moving slower than normal traffic on haul roads.

(13) Provide all machinery or equipment operating on rails, tracks, or trolleys (except railroad equipment) with substantial track scrapers or track clearers (effective in both directions) on each wheel or set of wheels.

(14) Do not use steering or spinner knobs unless originally designed or approved in writing by the manufacturer.

(15) Provide safeguards (for example, bumpers, railings, tracks,) to prevent machinery and equipment operating on a floating plant from going into the water (see chapter 19).

(16) Do not operate the controls of loaders, excavators, or similar equipment with folding booms or lift arms from a ground position unless so designed.

(17) Do not work in, pass under, or ride in the buckets or booms of loaders in operation.

(18) Operate tire service vehicles so that the operator will be clear of tires and rims when hoisting operations are being performed. Secure tires large enough to require hoisting equipment from movement by continued support of the hoisting equipment unless bolted to the vehicle hub or otherwise restrained.

(19) Equip each bulldozer, scraper, dragline, crane, motor grader, front-end loader, mechanical shovel, backhoe, and other similar equipment with at least one dry chemical or CO_2 fire extinguisher with a minimum rating of 10-B:C (see chapter 9).

(20) Secure fill hatches on water haul vehicles or reduce their opening to a maximum of 8 inches (20.3 cm).

(21) Maintenance and Repairs.

(a) Shut down and take positive means to prevent the operation of all machinery or equipment while repairs or manual lubrications are performed. Equipment designed to be serviced while running are exempt from this requirement.

(b) Make all repairs on machinery or equipment at a location that will protect repair personnel from traffic.

(c) Substantially block or crib heavy machinery, equipment, or parts thereof that are suspended or held apart by slings, hoist, or jacks before personnel work underneath or between them.

(22) Parking.

(a) Set the parking brake whenever equipment is parked.

(b) When equipment is parked on an incline, have the wheels chocked or track mechanisms blocked and the parking brake set.

(c) When equipment is left unattended at night adjacent to a highway in normal use or adjacent to construction areas where work is in progress, provide lights or reflectors or barricades equipped with lights or reflectors to identify the location of the equipment.

(23) Towing.

(a) All towing devices used on any combination of equipment must be structurally adequate for the weight drawn and securely mounted.

(b) Do not get between a towing vehicle and the piece of towed equipment until both have been completely stopped, the brakes are set, and wheels chocked on both the vehicle and equipment.

h. Dump Trucks. (18-8.h)

(1) Equip all dump trucks with a physical holding device to prevent accidental lowering of the body while maintenance or inspection work is being done.

(2) Secure all hoist levers to prevent accidental starting or tripping of the mechanism.

(3) Equip all off-highway end-dump trucks with a means to determine whether the dump box is lowered. The means must be plainly visible from the operator's position while looking ahead.

(4) Arrange trip handles for dump truck tailgates to keep the operator clear of interference.

i. Powered Industrial Trucks (PITs), Forklifts, and Telehandlers. All PITs, forklifts and telehandlers must meet the requirements of design, construction, stability, inspection, testing, maintenance, and operation according to ANSI/ITSDF B56.1. (18-8.i)

(1) When PITs, forklifts, or telehandlers are configured to hoist and lower (by means of a winch or hook and/or with rigging) and horizontally move a suspended load, refer to chapters 15 and 16.

(2) All PITs, lift trucks, stackers, and similar equipment must have the rated capacity posted on the vehicle clearly visible to the operator. When the manufacturer provides auxiliary removable counterweights, the corresponding alternate rated capacities must be clearly shown on the vehicle. Do not exceed the ratings.

(3) All PIT operators must be trained, qualified, and designated according to paragraph 18-3.

(4) When a PIT is left unattended, fully lower the load engaging means, neutralize the controls, shut off power, and set the brakes. Chock the wheels if the truck is parked on an incline.

(5) Utilize an overhead guard as protection against falling objects. It should be noted that an overhead guard is intended to offer protection from the impact of small material but not to withstand the impact of a falling capacity load.

(6) Properly secure dock board and bridge plates before they are driven over. Carefully and slowly drive over the dock board or bridge plates and never exceed their rated capacities.

(7) Operate the PIT at a speed that will permit it to be brought to a stop in a safe manner.

(8) On all grades, appropriately tilt back the load and load engaging means and raise the load only as far as necessary to clear the road surface.

(9) When ascending or descending grades in excess of 10%, drive loaded PITs with the load upgrade.

j. Floating Equipment. A QP must evaluate all equipment placed or operating on barges, pontoons, vessels, or other means of flotation for safe placement, transport, and operating conditions. At a minimum, the evaluation must include: (18-8.j)

(1) Proper operating procedures according to the manufacturer's instructions.

(2) Stability and structural assessment of equipment and barge/pontoon.

(3) Where and how the equipment will be secured to address positively secured positioning of the equipment (no movement/tipping), if required.

(4) Environmental restrictions.

(5) If the QP determines that the equipment can safely operate under the anticipated conditions within the manufacturer's operating procedures, the evaluation must be documented in writing by the QP and included in the AHA and provided to the USACE supervisor/KO or COR prior to work beginning (see para 18-6).

(6) Use of this equipment in this capacity is not allowed if the equipment cannot safely operate under the anticipated conditions and within the manufacturer's operating procedures, or if the QP determines that it is not safe to do so.

(7) If there are no manufacturer's operating procedures, an RPE with knowledge and experience with this type of equipment, must develop the safe operating procedures. The QP may then perform the evaluation of the equipment and

barge/pontoon. Document the evaluation in the AHA and provide a copy to the USACE supervisor/KO or COR prior to starting work. (See para 18-6)

(8) If this equipment is mechanized equipment used in conjunction with rigging to lift a load, it is considered LHE (see chapter 16).

k. Drilling Equipment. (18-8.k)

(1) Keep a copy of the drill manual available at the jobsite.

(2) Equip drilling equipment with two easily accessible emergency shutdown devices, one for the operator and one for the helper, unless it is designed by the manufacturer to have a single operator and single kill switch.

(a) Shut down rigs before any personnel enter the operational area of the drill.

(b) Position auger heads in the hole or place a cover over the hole before workers enter the operational area of the drill.

(c) If infeasible due to type of equipment being used, a CP must perform a risk assessment and document the findings in the AHA as to why this requirement is not practical. Identify appropriate precautions and/or controls to ensure an equal level of safety is being accomplished. (See para 18-6)

(3) Maintain clearance from electrical sources according to table 11-4.

(a) Post signs on the drilling equipment warning the operator of electrical hazards.

(b) Ensure proper clearance before moving equipment. Clearance must be monitored by a spotter. An electrical proximity warning device may be used in addition to a spotter to aid in the detection of live lines.

(4) Moving Equipment.

(a) Before drilling equipment is moved, survey the travel route for overhead and terrain hazards, particularly overhead electrical hazards.

(b) Do not transport earth drilling equipment with the mast up. The equipment may be moved with the mast up to drill a series of holes, such as in blasting, if the following conditions are satisfied:

(b-1) Movement is over level, smooth terrain.

(b-2) The path of travel has been inspected for stability and the absence of holes, other ground hazards, and electrical hazards.

(b-3) Travel is performed according to the manufacturer’s instructions.

(5) Equipment Set-up.

(a) Set-up equipment on stable ground and maintain it level. Use cribbing when necessary.

(b) Extend outriggers according to the manufacturer’s instructions.

(c) Follow the requirements of chapter 34 when drilling equipment is operated in areas with the potential for classification as a confined space.

(6) Equipment Operation.

(a) Monitor the weather conditions. Cease operations during electrical storms or when electrical storms are imminent. (See paras 1-7 or 2-7, as applicable)

(b) Drill crewmembers must not wear loose clothing, jewelry, or equipment that might become caught in moving machinery. High visibility vests used on drilling rigs, if required, must be of the break-away type.

(c) Utilize auger guides on hard surfaces. If infeasible due to type of drill rig being used, a CP must prepare a risk assessment and document the findings in the AHA as to why this requirement is not feasible. Identify appropriate precautions and/or controls to ensure an equal level of safety is being accomplished. (See para 18-6)

(d) Verbally alert employees and visually ensure employees are clear from dangerous parts of equipment before starting or engaging equipment.

(e) Direct the discharge of drilling fluids away from the work area to prevent the pooling of water.

(f) Utilize hoists only for their designed intent and do not load them beyond their rated capacity. Take steps to prevent two-blocking of hoists.

(g) Follow the equipment manufacturer's instructions if rope becomes caught in, or objects get pulled into, a cathead.

(h) Do not run or rotate drill rods through rod slipping devices. Do not hoist more than 1 foot (0.3 m) of drill rod column above the top of the drill mast. Do not make up, tighten, or loosen drill rod tool joints while the rod column is supported by a rod-slipping device.

(i) Control dust. Implement the requirements contained in chapter 6 when there is potential for silica exposure.

(j) Clean augers only when the rotating mechanism is in neutral and the auger is stopped. Use long-handled shovels to move cutting from the auger.

(k) Cap and flag open boreholes. Barricade open excavations.

(l) Provide means to guard against employee contact with the auger (for example, guard around the auger; barricade around the perimeter of the auger; electronic brake activated by a presence-sensing device). Employees must maintain a safe, clear distance while the drilling equipment is operating. If infeasible due to the type of drill equipment being used, the employee may proceed to approach the drill only when the drill has stopped rotating, the controls returned to the neutral position, and a clear signal has been given by the operator and understood by the helper that it is safe.

(m) Do not use side-feed swivel collars on drill rods unless they are retained by either a manufacturer-designed stabilizer or a stabilizer approved by an RPE.

l. All-Terrain Vehicles (ATVs). (18-8.l)

(1) All ATVs must be equipped with the following:

(a) An adequate audible warning device (for example, horn) at the operator's station in operable condition (if determined necessary for the work being performed).

(b) Brake lights in operable condition (regardless of light conditions).

(c) Operable rear-view mirror (mirrors may be present on handlebars).

(d) Mufflers.

(e) Spark arresters.

(2) Do not exceed the manufacturer's recommended payload and passenger limitations at any time.

(3) All operators and passengers must wear gloves and a DOT-approved motorcycle helmet with full-face shield or goggles at all times while operating ATVs.

(4) Do not drive ATVs on public roadways except to cross the roadway at designated crossing points or with a road guard. Paved road use may occur only explicitly when allowed by the manufacturer and when permitted by local laws and regulations.

(5) Use only ATVs with four or more wheels.

(6) Keep a copy of the operator's manual on the vehicle and protect it from the elements, if practical.

(7) Inflate tires according to the manufacturer's instructions.

m. Utility Terrain Vehicles (UTVs). (18-8.m)

(1) Maintain a copy of the operator's manual on the vehicle at all times and protect it from the elements.

(2) All UTVs must be equipped with the following:

(a) An adequate audible warning device (for example, horn) located at the operator's station.

(b) Brake lights in operable condition regardless of light conditions.

(c) Operable rear-view mirror.

(3) Do not exceed the manufacturer's designated occupancy (that is, designated seating that has built-in seat belts). Do not ride in the vehicle's back cargo area unless the vehicle is otherwise equipped to seat passengers with seat belts.

(4) Do not exceed the manufacturer's recommended load carrying capacity, personnel capacity, or maximum safe vehicle speed at any time.

(5) Secure cargo items as necessary to prevent movement or tipping. All loads over 50 lbs. (22.7 kg), to include medical litters, must be securely strapped to cargo tie-downs.

(6) Maintain manufacturer-installed safety equipment in working order and use according to the manufacturer's instructions.

(7) When a UTV is not equipped with a windshield, the operators and passengers must wear a DOT-approved motorcycle helmet with full-face shield or goggles when in motion.

(8) Do not drive UTVs on public roadways except to cross the roadway at designated crossing points or with a road guard.

(9) UTVs that are allowed to operate outside a controlled work area and/or on public roads must meet the minimum vehicle safety standards, to include ROPS, seat belts, and placement of "Slow Moving Vehicle" emblems where required.

(10) When not equipped with ROPS, operators and passengers of UTVs must wear approved head protection (helmet) and protective goggles or face shield.

n. Specialty Vehicles. (18-8.n)

(1) Whenever visibility conditions warrant additional light, equip all vehicles or combinations of vehicles with at least one headlight and one taillight in operable condition.

(2) Do not exceed the manufacturer's recommended load carrying capacity, personnel capacity, or maximum safe vehicle speed at any time.

(3) Utilize specialty vehicles only for their intended purpose. Maintain manufacturer-installed safety equipment in working order and use according to the manufacturer's instructions.

(4) Secure cargo items as necessary to prevent movement or tipping.

(5) Do not operate specialty vehicles on unimproved surfaces unless designed to do so.

(6) Wear head protection when operating Segway human transporters. At minimum, an approved bicycle helmet must be worn.

(7) Snow Machines.

(a) Use snow machines on public roadways only where authorized by state and local regulations or in an emergency.

(b) All snow machines must be equipped with the following:

(b-1) Brakes that will work under normal driving conditions and when loading.

(b-2) A throttle in which, when released by hand, will return engine speed to idle, close the carburetor, and disengage the clutch.

(b-3) A rear snow flap to deflect material or objects thrown by the track.

(b-4) A protective shield over all moving parts.

(b-5) Reflectors on the sides or side cowling.

(b-6) A rigid drawbar that is no longer than 10 feet (3 m) when towing.

(b-7) Operable rear-view mirror.

(c) Passengers are not authorized on single person snow machines except in case of an emergency.