



# **GUIDELINES FOR SAFE OPERATIONS OF MOBILE PLANT**



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## **ACKNOWLEDGEMENT**

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### **1.0 SELECTION OF OPERATORS**

#### **1.1 Medical Guidelines**

- A. The safe control and operation of mobile plant requires a reasonable level of physical and mental fitness. Both at initial selection and throughout sustained employment, these requirements should be defined and maintained.
- B. Work cycles should be varied so that the operator has the opportunity for some exercise e.g. leaves the cabin and walks some distance.
- C. Sight and hearing should be at a high level or aids should be worn if required.

#### **1.2 Qualifications and Experience**

- A. Employers, before employing mobile plant operators, should satisfy themselves as to the previous training experience and qualifications of applicants in relation to the machine to be used. Any certificate or document indicating the competency of an operator should be checked with the issuing authority. The possession of a driver's licence is not sufficient evidence that a person is qualified to operate the machine to be used.
- B. Mobile plant operators need to be sufficiently experienced, adequately trained for their work, or supervised by an experienced person. Instruction should include knowledge of hazards and the precautions to be observed to avoid them.

### **2.0 OPERATOR MONITORING**

- A. Employers should continue to monitor and assess operators at regular intervals to ensure the operator maintains the required standards. Where the operator's performance has deteriorated, retraining should take place immediately to prevent accidents.
- B. Persistent damage to equipment and materials may indicate that several factors should be checked:
  - a. Operator's judgement of position, distance, space and speed;
  - b. Sensitivity to controls;
  - c. Personal or health problems of the operator.
- C. Accidents may incur substantial costs in downtime, loss of product and damaged plant. Mobile plant owners and managers should be aware that an adequately trained operator might reduce these costs. Employers should be vigilant for signs of fatigue, substance abuse or other factors that could impair driver awareness and skill.

### 3.0 TRAINING FACILITIES

- A. The training location should be in an area where trainees will not be distracted and the safety of other people will not be endangered. It should be suitable for the type of equipment in use.

### 4.0 AUTHORISATION TO OPERATE

- A. No person should operate mobile plant without written Authorisation to Operate from their employer.
- B. This authorisation should be issued only after training is satisfactorily completed in respect of each mobile plant/attachment as named on the Statement of Attainment issued by a Registered Training Organisation (RTO).

### 5.0 ONGOING DEMONSTRATION OF PRACTICAL SKILLS

- A. Ongoing demonstration of the following practical skills by the operator should be observable:
  - a. **DAILY INSPECTION:** the routine daily inspection check as prescribed by the manufacturers or a company-developed check sheet must be carried out.
  - b. **OPERATION:** the efficient operation of the mobile plant should be within the safe limits defined by the manufacturer.
  - c. **CONTROLS:** competent use of foot and hand controls, signals and mirrors.
  - d. **HAZARDS:** awareness of the risk to people, plant, buildings and other machines, if the operation is not properly controlled, the equipment is faulty, or the site is hazardous.

### 6.0 OPERATOR RESPONSIBILITY

- A. The operator must be aware that they are responsible for the safe operation of the mobile plant and this includes the following:
  - a. Safe operation is the responsibility of the operator.
  - b. The operator shall develop safe working habits and also be aware of hazardous conditions in order to protect themselves and other personnel.
  - c. Before operating any mobile plant, operators shall have read the operator's manual, if available and had appropriate instruction from their trainer.
  - d. The operator shall be familiar with the operation and function of all controls and instruments before undertaking to operate the machine.
  - e. Before operating any machine, the operator shall be familiar with unusual operating conditions that may require additional safety precautions or special operating instructions.

### 7.0 OPERATORS TO OBSERVE SAFETY PROCEDURES

- A. Operators have a duty to safeguard themselves and others in the place of work by observing recognised safe work procedures and practices and not misusing machines or removing safeguards provided for protection of workers.
- B. Operators must always wear personal protective equipment such as hard hats, safety boots, safety glasses, hearing protection, respirators as required.

- C. Operators should always avoid loose clothing or any accessory, flapping cuffs, dangling neckties and scarves, or rings and wristwatches that can be caught in moving parts.

## **8.0 PRE-START CHECK**

- A. The following outlines minimum pre-start requirements:
  - a. Check all guards, ROPS, seat belts, ladders, steps, walkways and all other protective devices installed on your machine. Everyone should be in place and secure.
  - b. Carefully inspect your equipment for visual defects, e.g.: fuel leaks, lubrication and hydraulic system leaks and any broken or missing parts.
  - c. Inspect tyres for damage and proper inflation pressures. During pressure checks, also inspect for:
    - i. Objects wedged between dual tyres or embedded in tyres.
    - ii. Mismatched tyres.
    - iii. Missing valve caps or wheel nuts.
    - iv. Cuts, tears and breaks that may need repairs.
    - v. Abnormal or uneven wear.
    - vi. Damaged or poor fitting rim or rim flanges.
    - vii. Projecting bodywork, loose parts – anything that could contact and damage a tyre.
  - d. Avoid fire hazards when fuelling:
    - i. Do not smoke.
    - ii. Do not stand downwind where spilt fuel can drench you.
    - iii. Be sure nozzle contacts filler first to prevent static spark.
    - iv. Replace filler cap securely.
    - v. Ensure operator remains at the machine during the refuelling process.
  - e. Ensure that all windows are clean and you have good visibility through them.
    - a. Ensure all necessary tools and other items are stored in the toolbox, not left loose in the cab.
    - b. Inspect air system lines, valves, drains, cocks and other components. See that air pressure is correct and there are no leaks.
    - c. Check engine and operator compartments for rubbish or loose objects that could cause fire or jam controls.
    - d. Checklists should be obtained from the manufacturer, if available, or appropriate checklists developed and supplied by the company.
    - e. If deficiencies that compromise the safe operation of the unit are found, the equipment will be taken out of service, suitably labelled and not operated until the repairs are completed.

## **9.0 CARE WHILE GETTING ON OR INTO MOBILE PLANT**

- A. The following should always be observed:
  - a. Always use available handrails, ladders or steps.

- b. Clean all oil, grease or mud from your hands, shoes and machine walkways before attempting to mount the machine.
- c. Maintain three points of contact with steps and rails, such as both hands and one foot or both feet and one hand.
- d. Ensure foot controls are clean and dry to reduce the possibility of your foot slipping off the pedals and loss of control.
- e. **DO NOT USE THE STEERING WHEEL OR OTHER CONTROLS AS HANDHOLDS.** Use only the handholds provided by the manufacturer.
- f. Securely fasten doors or curtains so they do not block vision or create other hazards.

## 10.0 SAFE START PROCEDURE

- A. The following should always be observed:
  - a. Never attempt to start engines except from an approved operator's position.
  - b. Check for Warning Tags. If there is a warning tag on the starting switch or engine starting controls, **DO NOT OPERATE** the switch or start the engine until the warning tag has been removed by the person who placed it there.
  - c. Place directional controls in neutral, disengage clutch on manual transmission equipped machines, or apply brake on power shift or automatic transmission equipped machines, start engine.
  - d. If it is necessary to start an engine in an enclosed area, provide adequate ventilation. Exhaust fumes can kill.
  - e. Do not start or operate a machine or any of its attachments from any place other than the designated operator's position.
  - f. Consider operating the horn prior to starting to warn people in the vicinity.

## 11.0 POST START – TEST PROCEDURE

- A. The following should be observed:
  - a. Check all gauges and indicators for proper readings.
  - b. Be sure area is safe for operation.
  - c. Test service, emergency and parking brakes to ensure adequate operation in both forward and reverse directions.
  - d. Recheck lights, horn, backup alarms and other safety warning devices.
  - e. Check bucket, blade, hoist and other equipment controls through a complete cycle to check for malfunctions.
  - f. While travelling slowly, steer the machine both right and left to be sure the steering is working properly.
  - g. Report all safety-related defects to the Supervisor for immediate correction. Do not operate any machine until all defects are corrected.
  - h. Back-up alarms or other safety warning devices shall be properly maintained.

## 12.0 PROTECTION OF OTHER PEOPLE

- A. The following should be observed:
  - a. Never let anyone in or near the pivot area of an articulated machine. When you turn, they could be crushed. Machines equipped with accumulator type steering may turn when the steering wheel is moved, even though the engine may not be running.

- b. Look behind before you reverse, and ensure reverse warning signal is working.
- c. Do not permit passengers to ride on a machine unless the manufacturer has provided an approved passenger seat.
- d. Do not allow any person to pass, stand or work under the elevated portion of any machine, whether empty or loaded, unless it has been securely propped to prevent sudden descent.
- e. Never use a bucket or other attachment as a man lift, unless the manufacturer has approved it for this purpose.
- f. Do not operate a machine when under the adverse influence of alcohol, drugs, or medication or while suffering fatigue.
- g. If you must turn your attention elsewhere, stop the machine till the distraction is gone.
- h. Operators are to remain in the cab of the dump truck while being loaded.
- i. Wear your seat belt. The ROPS protection is no use unless you are in it.

### **13.0 RULES WHEN TRAVELLING**

- A. Any bucket, blade, bowl or other attachment should not be used as a brake, except in the case of an emergency.
- B. Carry any attachments low so they do not block vision or reduce stability while travelling. Do not travel with hoist raised on dump trucks.
- C. Avoid crossing obstacles such as ridges, curbs, logs or railroad tracks. If you cannot avoid them, reduce speed and cross at an angle.
- D. Do not work too close to the edge of faces, banks or excavations as edges may fail causing the machine to go over the edge. If this is likely, make sure the machine can back away from it.
- E. Use care on slopes. Operate straight up and down slopes whenever possible. Side-hill operation reduces machine stability and can lead to rollover.
- F. Stay in proper gear when travelling downhill. **NEVER COAST IN NEUTRAL.** Maintain engine R.P.M. to give you control when you need it. It is generally recommended that the same gear should be used to descend a hill loaded as ascending a hill loaded.

### **14.0 CARE IN HAZARDOUS AREAS**

- A. Whenever possible, two persons should work together in hazardous areas – one to operate the machine and the other to direct and watch for dangers.
- B. Never enter a dust cloud or a dark area such as an underpass, bunker or workshop before checking it for obstructions or hazards you cannot see.
- C. Watch out for overhead dangers, such as overhead power lines, conveyors, overhanging trees or falling rocks. If undercutting is absolutely unavoidable, use overhead protection.
- D. When working near overhead power lines, maintain minimum clearance as specified in the Regulations.
- E. Check for buried services when digging near plant or buildings.



## 15.0 TOWING AND LIFTING

- A. If towing is unavoidable, follow manufacturer's recommendations. If there are none, use fixed drawbars or certified wire strops, not chains.
- B. Use caution when backing up to a drawbar. Watch for spotter's signals. Wait until they are clear before pulling away.
- C. When using cables or chains to move a load, make sure they are of adequate size and inspect them for any defects before use.
- D. Make sure they are properly and securely attached to the load and towing or lifting machine.
- E. When towing, move slowly when taking up the slack in the towrope, as a sudden pull could snap the cable, chain or rope, causing it to whip around dangerously. Clear all personnel from the area before attempting to move the vehicle. Keep the towrope tight at all times.
- F. When lifting, always use the designated lifting point. Failure of linkage or slings could result if chains or slings are incorrectly attached.
- G. Always ensure the chains or slings used to lift the load are of adequate strength, allowing for the required factor of safety, to lift the weight involved and that they are free of any defects.
- H. Never exceed the manufacturer's machine load rating chart when lifting, as this may cause it to overturn.
- I. When using a signal person, ensure that you have conferred beforehand so that you both know what the signals to be used mean.

## 16.0 STOPPING WORK SAFELY

- A. Select a safe parking place.
- B. Park on level ground wherever possible. If you must park on a grade, park the machine at right angles to the slope and block the wheels to prevent movement.
- C. Park in a non-operating area or a designated parking area. Use warning signals or barriers where needed.
- D. Make sure the machine is parked on firm ground to prevent it from sinking and becoming stuck, or the possibility of overturning.

## 17.0 CORRECT SHUT-DOWN PROCEDURE

- A. The exact shutdown procedure varies for different machines so always read and follow the operator's manual carefully.
- B. Lower all attachments to the ground and relieve pressure in working circuits.
- C. Place the direction controls in neutral, set the parking brake and stop the engine.
- D. Consider turning of wheels or articulating in a safe direction when forced to park on a hill.
- E. Lock controls and ignition to prevent unauthorised starting or moving. Remove the keys.

- F. Bleed accumulators if recommended by the manufacturer.
- G. To protect against tampering and vandalism, lock the cab and secure any other protective devices provided on the machine.
- H. Do not jump off your machine. Use the stepping points and handrails provided. Face the machine when getting off, for greater safety. Use three points of contact.
- I. Be careful of slippery conditions on stepping points, hand rails and on the ground.
- J. Notes of any defects to be reported to the supervisor.

## **18.0 GENERAL**

### **18.1 Power Lines**

- A. Do not operate within 4m of overhead power lines unless WRITTEN authority has been obtained from the local electrical supply authority or arrangements have been made to have the lines deadened. If your machine contacts a power line:
  - a. Stay where you are.
  - b. Do not allow anyone to touch the machine.
  - c. Move the machine off the wire if possible.
  - d. Earth the machine into the ground if possible. Stay aboard and await instructions.
  - e. Do not step off the machine.
  - f. Threat of tyre explosion exists for several hours after contact.

### **18.2 Hours of Work**

- A. Operators should not be required to work long hours at the controls of plant. Shifts should be structured to allow for regular breaks for operators.

### **18.3 Safe Operation of Bulldozers**

- A. Wherever possible avoid travel across slopes. Drive straight up and down slopes. If the machine starts to slide sideways when working across a slope, turn the machine downhill and drop the blade.
- B. If you have to drive down a steep slope, keep a good blade full of material in front of the blade on the way down. If material is being lost, lowering the blade slightly may help, but lowering it too far brings the danger of overturning.
- C. When you are working on slip clearing, proceed with caution and watch the slope. Further falls may occur.
- D. When clearing trees, watch out for dead branches in treetops as abrupt contact with a butt may dislodge them.
- E. Avoid obstacles such as rocks or logs. If you are forced to cross them, use extreme caution and change to the lowest gear. Ease up to the break-over point and ease down to minimise the jolt on contact on the other side.
- F. Be careful when working near the edge of banks and ditches or under overhanging material. The vibration and weight of your machine may cause the edge to give way or overhanging material to fall.

- G. Before starting work in a river, check water depths and the bed for holes. Do not work alone in deep water. Another person must be present at all times. Place a buoyed safety line across the river downstream of the work area.

#### **18.4 Safe Operation of Excavators**

- A. When excavating trenches, place the excavated material at least 600 mm clear of the edge, where there is no danger of it falling back into or collapsing the side of the trench.
- B. Create a level area to operate from when working on a steep grade. If you cannot do this, avoid swinging your boom downhill any further than necessary and operate your machine slowly to maintain stability.
- C. When travelling up or down a steep slope, place the track sprockets at the rear of the machine. For uphill travel, extend the boom and bucket forward, and for downhill travel, place them close in, in order to maximise stability and traction.
- D. Watch boom clearance when travelling. Uneven ground may cause the boom to weave or collide into obstructions.
- E. Take care at the point of balance on the peak of a steep slope. Reduce speed and maintain stability until on level ground.
- F. Avoid jerky swings or sudden braking. These can make the machine unstable and overload machine components.
- G. Do not turn sharply while travelling up a steep slope, because the machine's stability will be threatened.
- H. Do not attempt to operate attachments while travelling as this may starve one of the track motors and result in an unintended turn

#### **18.5 Safe Operation of Graders**

- A. When grading across a slope, avoid blade down-pressure and obstacles, as either can tip the machine. For maximum stability, operate at low speed, lean the front tyres towards the uphill side and cast material to the downhill side of the machine.
- B. Operate on as level a surface as possible when cutting high banks. With the blade raised, the grader is less stable than normal.
- C. When working on existing roads, place warning signs and watch out for unexpected vehicles.

#### **18.6 Safe Operation of Motor Scrapers**

- A. Do not accelerate a tandem scraper's rear engine when entering a sharp turn, or the machine may jack-knife.
- B. Face the direction of travel. If you have to watch the operation of rear equipment, use your rear vision mirror.
- C. When entering sharp turns, fill areas or downgrades, apply retarder and/or service brakes. Select the correct gear before travelling downhill. On long downgrades, use the engine to assist braking. Avoid "fanning" the air brake pedal. Repeated light application of the brake may exhaust air pressure faster than the system is able to replenish it, leading to brake failure.

**18.7 Safe Operation of Wheel Loaders**

- A. Carry your bucket low so that it does not block your vision and to maintain stability while travelling. If the loader begins to tip, drop the bucket promptly.
- B. When stockpiling material, carefully construct and consolidate the ramp at a grade easily handled by your machine.
- C. When working on slopes, work with the bucket facing uphill where possible in order to maximise stability and avoid tipping.
- D. When clearing road slips, take care that further slips or trees do not fall while you are moving material. Keep your eye on the material above.
- E. Do not move loads over the heads of workers, truck cabs or any vehicle.
- F. Never transport persons in the loader bucket.

**18.8 Safe Operation of Road Rollers**

- A. Take care not to overbalance on the edge of a road formation. Examine edges for soft spots before starting work.
- B. Avoid gear changes on steep sections. Remember that a missed gear change may result in loss of control and the roller overturning. Hand- or parking brakes should not be relied on to maintain control.
- C. Park on the flat. If you must park on a slope, chock your wheels.
- D. Do not climb onto a moving roller.

**18.9 Safe Operation of Dump Trucks**

- A. Stay in the cab of your vehicle while it is being loaded.
- B. Do not raise the hoist until the truck is stationary.
- C. Do not move off from the dump point until the truck hoist is fully lowered.
- D. Where the truck is fitted with a rollover protective structure and seat belts, the seat belts shall be worn at all times.

**19.0 SAFE MAINTENANCE OF MOBILE PLANT**

- A. The following should be observed when preparing the plant for service.
  - a. Park machine on level ground with wheels blocked.
  - b. Lower all attachments to the ground.
  - c. Bleed all pressure systems.
  - d. Attach all necessary warning tags.
  - e. If attachments or truck hoists must be raised for maintenance, block securely or use lift arm safety bars to prevent falling.
  - f. Machines should not be serviced with anyone in the operator's seat unless they are assisting in the servicing, and are qualified to operate the machine.

## 20.0 FIRE HAZARDS

- A. Be careful with LPG, always refer to the manufacturer's operation and maintenance manual when working on machines fitted with LPG equipment.
- B. Petrol is highly flammable and should never be used as cleaning fluid. Use a good commercial, non-flammable solvent for cleaning.
- C. Store flammable starting aids in a cool, well ventilated fireproof place, out of reach of unauthorised personnel.
- D. Before commencing service, check machine for loose hydraulic hoses and fittings, loose wiring or electrical components that may cause fire.

## 21.0 FIRE SUPPRESSION

- A. Know which fire extinguisher to use on different types of fires.
- B. Know where the extinguishers are kept and how to use them.
- C. Replace or recharge all fire extinguishers after any usage.
- D. Fire extinguishers to be mounted on all mobile plant.
- E. Ensure 6-monthly checks are made of all fire extinguishers.

## 22.0 BATTERY MAINTENANCE

- A. When charging batteries, leave the battery compartment open for ventilation, erect "No Smoking" signs and remove battery caps. Always check the electrolyte level with the engine shut down.
- B. Never check battery charge by placing a metal object across the battery posts. The sparks could cause an explosion. Use only a voltmeter or hydrometer to check batteries.
- C. Never use an open flame to check battery fuel or coolant levels on a machine as this can lead to an explosion.
- D. Never smoke whilst checking or charging batteries.
- E. Eye protection must be worn when checking or charging batteries.

## 23.0 GENERAL MAINTENANCE PRECAUTIONS

- A. Keep maintenance area clean and dry. Oily or wet floors are slippery. Wet spots are dangerous around electrical equipment. Greasy rags are a fire hazard.
- B. Keep equipment clean and free of dirt and oil so you can spot loose or damaged parts.
- C. Before working under a machine, make sure that it is adequately checked. Be sure to tag and/or lock the controls so no one else will start it. If more than one person is working on a machine, each must be familiar with the controls, and aware of what the others are doing.
- D. Never adjust pressure relief valves to higher than recommended working pressures. Adjust pressures with an adequate gauge in the system.

- E. Remove radiator caps carefully. Wait until coolant is below boiling point before removing the radiator cap.

## **24.0 PRESSURISED SYSTEMS**

- A. Relieve pressure in all systems before working on machine. Follow the manufacturer's recommended procedures.
- B. Be careful of hot oil when working with hydraulic lines or draining engine oil. If possible, allow the machine to cool before working on it.
- C. Keep brakes adjusted. Improperly adjusted brakes could cause an operator to lose control.
- D. When changing cutting edges or cables, wear gloves to protect your hands. Block and secure the equipment.

## **25.0 WORKSHOP SAFETY**

- A. If you have to crawl under a machine, be sure you are out of traffic, the wheels are securely blocked and the controls are tagged and/or locked.
- B. Exhaust gases are deadly. If it is necessary to start a machine inside a building, make sure there is adequate ventilation and get the machine outside as soon as possible. Periodically check the exhaust system for leakage.
- C. Before you remove inspection covers, stop the engine. Do not let tools or loose objects from your pockets fall into the opening.
- D. Lower all attachments flat to the ground and stop the engine before working on any machine.
- E. Do not attempt to operate any machine or move controls for any reason, unless properly positioned in the operator's seat.
- F. Always shut off the engine before checking or adjusting belt tension. If it is necessary to make other adjustments while the engine is running, keep clear of moving parts.

## **26.0 TYRE SAFETY**

- A. Before you place a jack in position, block the wheels on the other side of the machine. Always block the machine up to prevent it from falling.
- B. Be alert to a possible blow out of inflated tyres that are damaged by cuts, sidewall bubbles, etc.
- C. Check to see if tyres contain ballast. Follow manufacturer's recommended procedure for removing ballast.
- D. Remove valve cores carefully and exhaust all air from tyre. Run a piece of wire through the valve stem to ensure it is not plugged.
- E. Deflate the tyre before trying to remove rocks or pry objects from the tyre tread. Keep fingers clear of bead breakers and rams and stand to one side when you apply pressure. If the bead breaker slips, it can fly off with enough force to cause severe injury. Be careful to clean all dirt and rust from the lock ring gutter.
- F. Never cut or weld on assembled and pressurised tyres and rims.

- G. Always use an inflation cage, safety cables or chains when inflating tyres.
- H. Do not attempt to use extremely high air pressures to seat a tyre bead. If a tyre cannot be seated using normal pressure, contact the manufacturer for advice.
- I. Never begin to inflate a tapered bead tyre unless the bead seat band has been pried out over the lock ring.
- J. If tapping of the lock ring is required to assist seating, use extreme caution.
- K. Never mix rim parts of different manufacturers or different sizes. Do not use any damaged parts.
- L. Inflate a stored tyre only enough to keep rim parts in place. Use care if you must transport a fully inflated tyre, a safety chain may be required.
- M. Do not inflate tyres with flammable gases or with air from systems utilising alcohol evaporators.
- N. Check tyres only when machine is empty.
- O. When adding air, do so from a distance. Use a long hose with a self-attaching air chuck. Always stand to one side when inflating tyres.
- P. A certain amount of air pressure rise during operation is normal and should not be reduced. High speeds during transport may produce excessive tyre pressure due to heat. Never bleed tyres. Reduce your speed or stop and let tyres cool.

## **27.0 LOADING MACHINERY ON TO A TRANSPORTER**

- A. Load and unload on a level area.
- B. Block transport vehicle to prevent it from moving.
- C. Use ramps of adequate strength, low angle and proper height.
- D. Keep trailer bed clean of clay, oil and all materials that can become slippery.
- E. Attach steering frame lock on articulated machines.
- F. Tie and block machine securely for transport.