

Safety in Construction No. 25

ROAD WORKS SAFETY GUIDE

Important Note:

All the publications in the Publications Archive contain the best guidance available at the time of publishing. However, you should consider the effect of any changes to the law since then. You should also check that the Standards referred to are still current.



**Department of Labour,
Wellington New Zealand**

Archive

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1: Traffic Control at Work Sites

1.1 General

Every year an average of four people are killed and 45 injured in accidents that occur when traffic has to pass through road construction or maintenance works. The main causes of these deaths and injuries are inadequate signposting and lighting and drivers failing to notice road workers. Road works operations need to be carefully planned and administered to avoid such accidents.

1.2 Accident Prevention

Major changes in road conditions which require a sudden driver reaction should be avoided wherever possible because they can lead to hazardous situations and accidents. Where changes are unavoidable, drivers must be prepared for the change in driving conditions.

Road signs should be set up in accordance with the National Roads Board publication *Manual of Temporary Control of Traffic*. Signs must be kept clean and well maintained if they are to be effective. Press and radio releases are often a valuable means of warning drivers of what to expect at a site, thus minimising impatient and dangerous behaviour. They are also good public relations.

Workers who control traffic must be properly trained. Training should be based on the NRB *Manual of Temporary Control of Traffic* and the *Traffic Controllers Hand Book*. A traffic controller must know where to stand, how to slow or stop traffic, and how to coordinate public and construction traffic movements.

Controllers should use two-way radio communication when visual contact between traffic controllers is not possible. Where the site is suitable and they are available, arrangements should be made to use temporary traffic signals to control traffic. Before use, the approval of the Regional Traffic Engineer is required.

Traffic controllers and ganeral road workers should wear suitable conspicuous clothing to ensure that they can be seen by motorists. (Recommended protective clothing for day and night time wear is given in table 1 on p. 62.)



Be safe. Use recommended temporary traffic control.

When temporary traffic control has been set up at a site, it should be assessed for effectiveness, for both day and night time operation. Accidents or near-accidents, damaged signs, skid marks, queues, and unusually high or low speeds are all indications that control arrangements need to be reviewed. Any changes necessary should be made as soon as possible. Unnecessary traffic control signs or road markings must be removed as they tend to confuse motorists and make them careless.

Where vehicles are held up in queues, a worker should be appointed to talk with motorists, apologise for delays, estimate the length of the delay, and generally keep people informed.

1.3 Speed Limits

Speed limits set through a road works site should be as high as possible, consistent with safe site operations and traffic movements. (Controlling authorities have the authority to place non-standard temporary speed limit signs as per Traffic Regulation 23). Compliance with reasonable speed limits will then be more likely.

If motorists perceive a speed limit to be unrealistic, they are likely to disregard it.

2: Operator and Driver Training

2.1 General

Only experienced and physically fit workers should be permitted to operate trucks and construction equipment.

Trainee operators and drivers must acquire a good knowledge of the working procedures of any machine they are expected to operate and any hazards they are likely to encounter. They must be closely supervised until they prove competent to work on their own and have obtained a licence for the class of machine they are to operate.

Before operators are transferred to a new machine, or one they are not familiar with, they must be instructed in the operating features of that machine.

2.2 Machine Safety Checks

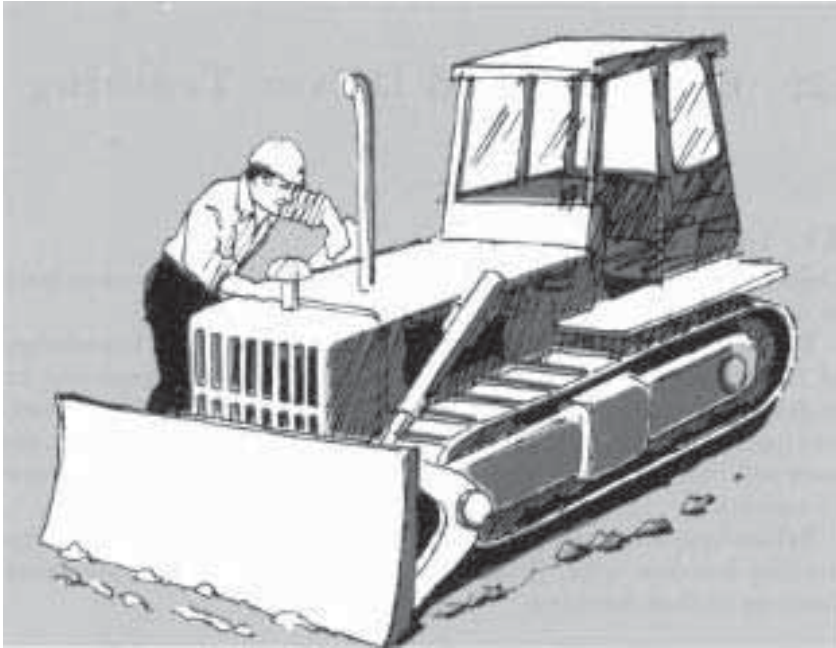
Operators and drivers should be trained to walk round their machine before starting work for the day in order to check it in accordance with an employer's or manufacturer's check-list. Items to be checked should include:

- (a) Fuel, oil, and water levels;
- (b) Water, fuel, and hydraulic lines for leaks;
- (c) The condition of the tracks or tyres as applicable;
- (d) The condition of attachment cutting edges and teeth;
- (e) That good visibility is possible from the cab, windows, mirrors, and headlights;
- (f) That steps and pedals do not have worn or slippery surfaces;
- (g) That warning devices are working and that there is no loose gear or material on the machine.

Any defects noticed should be immediately reported to the supervisor for correction. If any defect affects the safe operation of the machine, it should be rectified before the machine is used.

After starting the engine and before moving off, operators should check that the brakes, controls and gauges are functioning correctly, and that other workers are clear.

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Inspect your machine before starting work.



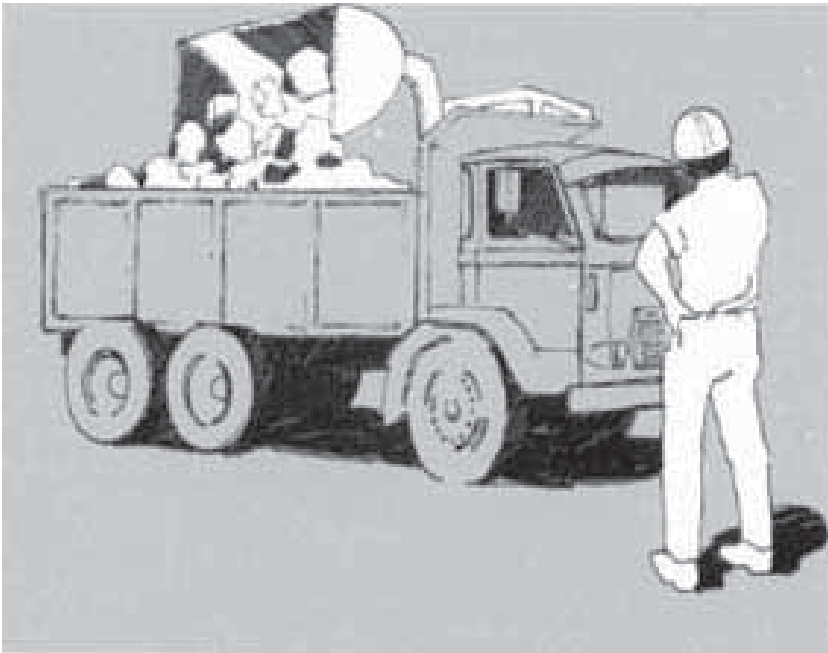
Keep your windows and mirrors clean and avoid accidents.

3: Truck Drivers

3.1 Loading

Watch for and avoid other vehicles, personnel and rock outcrops on entering or leaving the loading area. Wait a safe distance for trucks ahead of you at the loading point, and follow the direction of the signalman or loader operator before moving into the loading position. Never enter or leave the cab while loading is in progress. Move off when signalled that loading is complete.

Load materials such as timber so that they do not project beyond the truck body and present a hazard to other plant, people or structures. Where material is to be transported on a public road, the Traffic Regulations 1976 require that if material projects 1 metre or more beyond the front or rear, or 100 mm on either side, it must have a white flag fastened to the projecting end. Unusually wide or long loads require a permit from the Ministry of Transport.



Keep clear when trucks are being loaded.



Reverse safely. Use a signalman.

Secure loads at the lowest possible level on the tray with ropes or chains, and take special care when your truck is to travel over rough terrain.

3.2 Road Safety

Drive defensively. Obey road signs. Never race other vehicles. When you are following another vehicle, always allow enough distance to stop safely. One truck length for every 10 km per hour of truck speed should be the minimum space between vehicles.

3.3 Backing

Backing is the most hazardous truck operation. Every year at least one worker is killed by being run over by a reversing truck. Reversing alarms, which are fitted on some trucks, are effective in warning workers of the danger. Back trucks only when they are under the direction of a signalman or when you are satisfied that the way is clear and will remain clear.

A useful device to prevent the operators of chip spreaders from being run over is a platform mounted on the tailgate. The worker sits on the platform

while operating the spreader fantail. However, watch out for stationary vehicles and plant in the path of the chip spreader.

3.4 Tips and Fills

Trucks sometimes fall over a tip head because the driver backs over the edge or the edge collapses under the weight of the truck. A protective berm or timber baulk should be used. Alternatively, back under the control of a signalman in order to avoid this possibility. Where ground conditions are soft, or the tip head is likely to subside, dump loads back from the edge and get a dozer to move the material over the edge.

3.5 Unloading

Don't raise your truck's tray to unload material unless the truck has stopped. Unless you are spreading road metal, do not move the truck unless the tray is fully down.

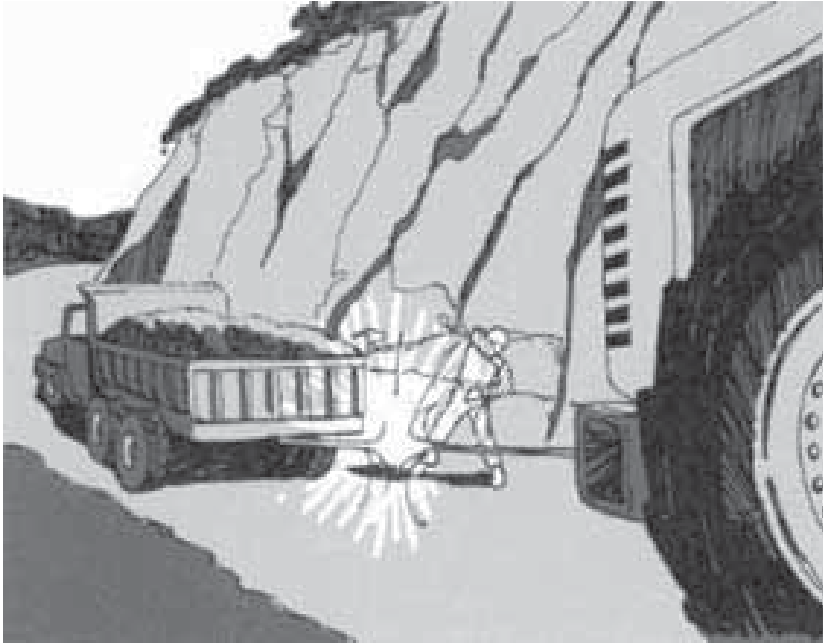
Take special care when running out metal on a road. With the tray up, trucks are less stable and are prone to roll over, particularly on hilly sections and on roads with surface irregularities or steep shoulders. Also the tray may hit overhead power or telephone wires.

3.6 Transporting Workers

Trucks which are regularly used for transporting workers should be enclosed, have seats which are attached to the vehicle, and have a safe means of access and egress.

Drivers of trucks carrying passengers should be alert, dependable and careful. Safety rules you should follow are:

- (a) Don't allow passengers to ride on the sides or ends of trucks with their legs hanging over or arms outside. Nor should they be allowed to ride on running boards or on loads likely to shift.
- (b) Don't start the truck until everyone is seated.
- (c) Don't allow workers to get on or off the truck while it is in motion.
- (d) Don't allow tools, plant or gear to be stored in the same compartment as workers. If minor items are stored in the compartment secure them against movement.
- (e) Ensure that exhaust fumes do not enter the passengers' compartment.



Keep clear of the area between vehicles when they are being towed.

3.7 Towing

When you are towing another vehicle, the precautions to take are:

- (a) Make sure the towing cable is not damaged and has a safe working load adequate for the job. Slings, strops or chains which are used for towing should not be used later for lifting heavy gear or materials as they may have been damaged during the towing operation.
- (b) Before backing up, make sure everyone is clear. Get help from a signalman if your rear view is obstructed.
- (c) Attach the towing cable securely to the machines at the points recommended by the manufacturer. If these are not known, make sure you select fixing points that will not damage the cable or the machine.
- (d) Check what brakes are available on the towed vehicle. Do not rely on parking brakes as a means of control.
- (e) When moving off, take up the slack carefully. Do not jerk the cable, and keep it taut to avoid damage.
- (f) Keep your towing speed down and as constant as possible.

4: Mobile Plant Operators

4.1 Operator Briefing

Before starting work on a project, make sure you are fully briefed on the:

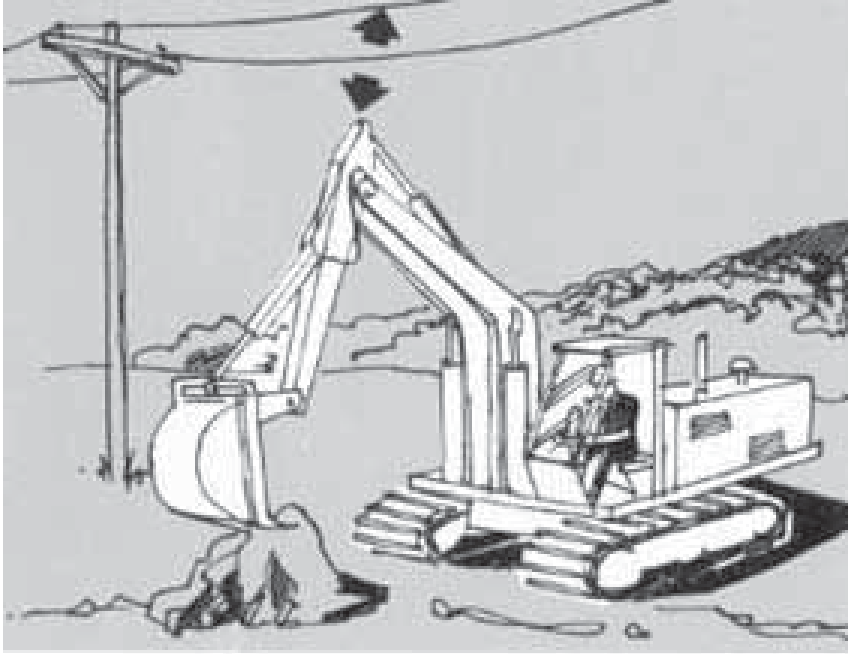
- (a) Boundaries of the work area;
- (b) Haul routes and general construction pattern;
- (c) Public traffic and pedestrian access routes and the location of crossing points;
- (d) Location and depth of underground services;
- (e) Location of other hazards and obstructions.

4.2 Power Lines

Don't operate within 3.5m 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.



*Check the location and depth of underground services before work starts.
Don't get electrocuted.*



Don't operate within 3.5 m of overhead power lines.

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) If you have to get out, don't step down – jump, preferably downhill.
Don't be a link between the machine and the ground and become a conductor!

4.3 Hours of Work

Operators should not be required to work long hours at the controls of plant. Tiredness leads to inattention and accidents.

4.4 Do's and Don'ts–Bulldozers

Do – Wherever possible avoid sidehill travel. 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.



Watch for falls of rocks and trees when slip clearing.

Do – If you have to drive down a steep slope, keep a good bladeful of spoil in front of the blade on the way down. If dirt is being lost, lowering the blade slightly may help, but lowering it too far brings the danger of overturning.

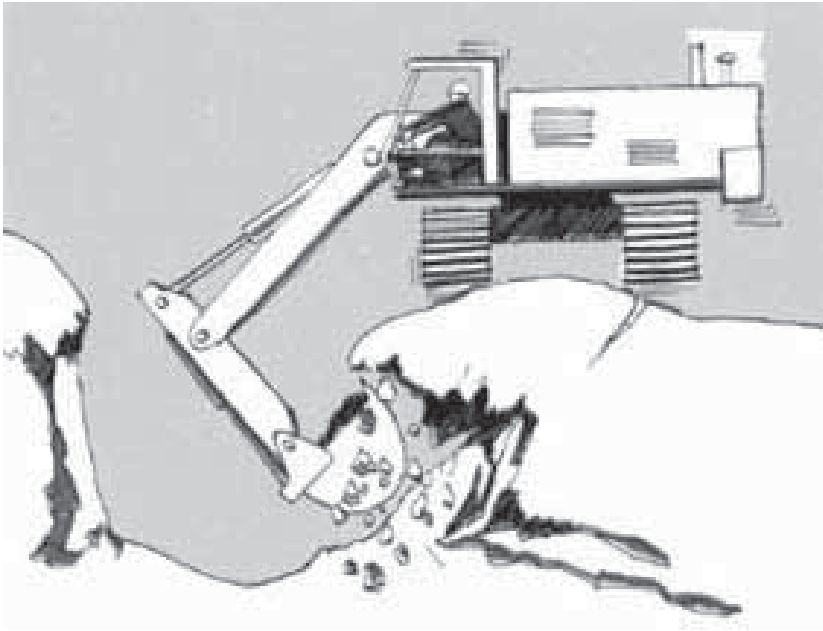
Do – When you are working on slip clearing, proceed with caution and watch the slope. Further falls may occur.

Do – When clearing trees, watch out for dead branches in tree tops as abrupt contact with a butt may dislodge them.

Do – 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.

Do – 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.

Do – 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.



Make sure you do not undercut your machine.

4.5 Do's and Don'ts—Excavators

Do – 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.

Do – 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.

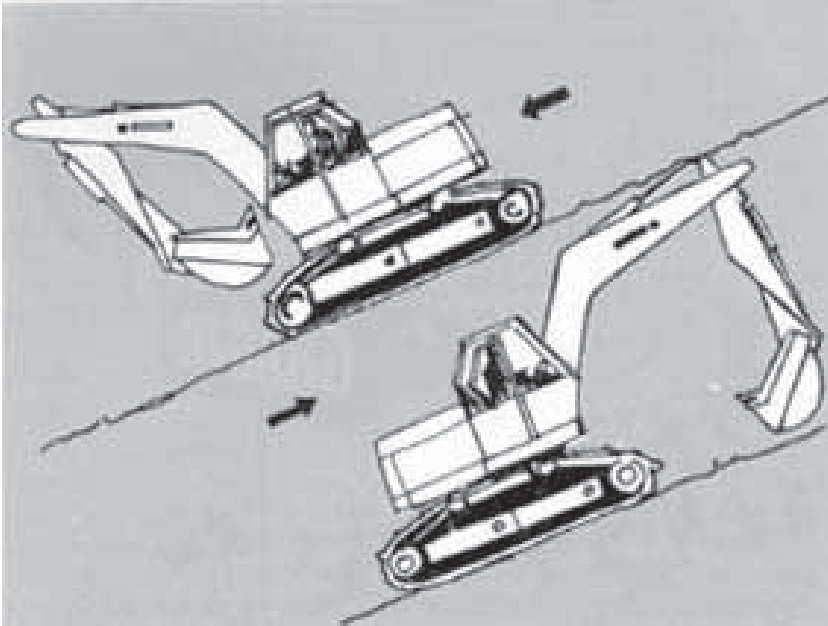
Do – When travelling up or down a steep slope, place the track sprockets at the rear of the machine. For uphill travel extend the boom and bucket forward, and for downhill travel place them close in, in order to maximise stability and traction.

Do – Watch boom clearance when travelling. Uneven ground may cause the boom to weave or collide into obstructions.

Do – Take care at the point of balance on the peak of a steep slope. Reduce speed and maintain stability until on level ground.

Do – Avoid jerky swings or sudden braking. These can make the machine unstable and overload machine components.

Don't – Turn sharply while travelling up a steep slope, because the machine's stability will be threatened.



Use boom to maximise stability and traction when going up or down hill.

Don't – Attempt to operate attachments while travelling as this may starve one of the track drive motors and result in an unintended turn.

4.6 Do's and Don'ts – Graders

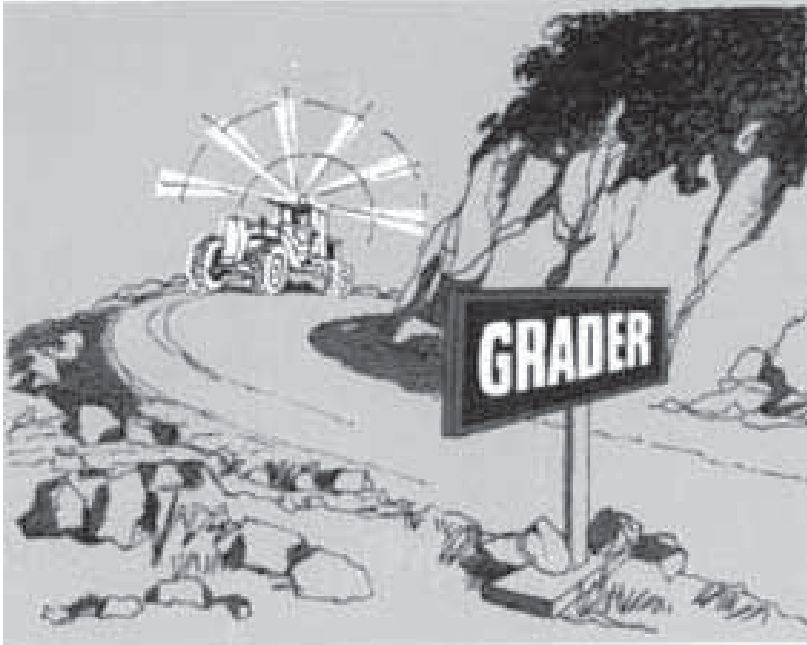
Do – When grading across a slope, avoid blade down-pressure and obstacles, as either can tip the machine. For maximum stability operate at low speed, lean the front tyres towards the uphill side, and cast material to the downhill side of the machine.

Do – Operate on as level a surface as possible when cutting high banks. With the blade raised, the grader is less stable than normal.

Do – When working on existing roads, place warning signs and watch out for that unexpected vehicle.

4.7 Do's and Don'ts – Motor Scrapers

Don't – Accelerate a tandem scraper's rear engine when entering a sharp turn, or the machine may jack-knife.



Place warning signs when operating on roads.

Do – Face in the direction of travel. If you have to watch the operation of rear equipment, use your rear vision mirror.

Do – 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.

Do – Drop the bowl in an emergency!

Don’t – Speed as a relief from boredom!

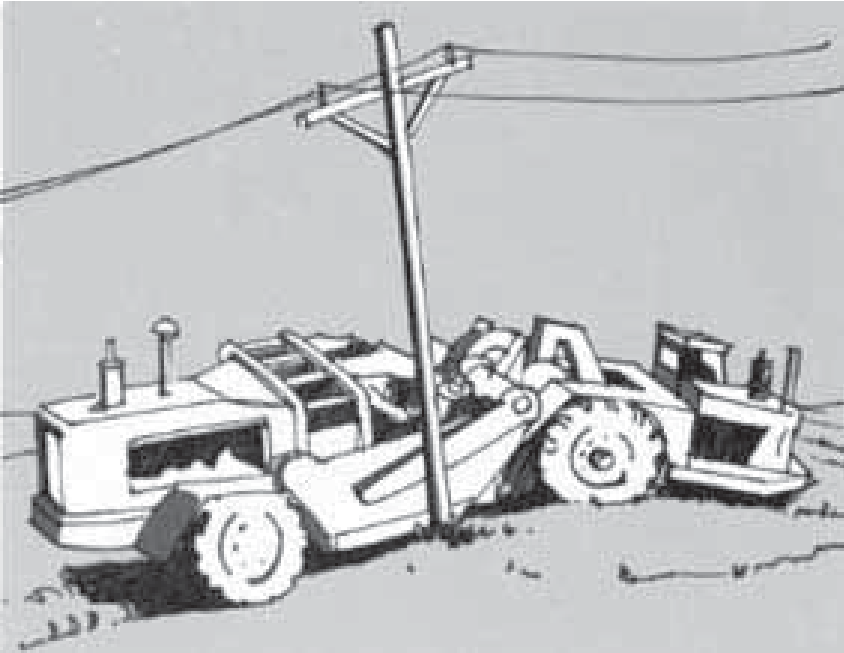
4.8 Do’s and Don’ts-Wheel Loaders

Do – 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.

Do – When stockpiling material, carefully construct and consolidate the ramp at a grade easily handled by your machine.

Do – When working on slopes, work with bucket facing uphill where possible in order to maximise stability and avoid tipping.

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Don't cut corners – it is dangerous. Slow down and leave yourself enough clearance for the turn



Carry your bucket low for good visibility and stability



Don't move loads over the heads of workers, truck cabs or vehicles.

Do – 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.

Don't – Move loads over the heads of workers, truck cabs or any vehicle.

4.9 Do's and Don'ts—Road Rollers

Do – Take care not to overbalance over the edge of a road formation. Examine edges for soft spots before starting work.

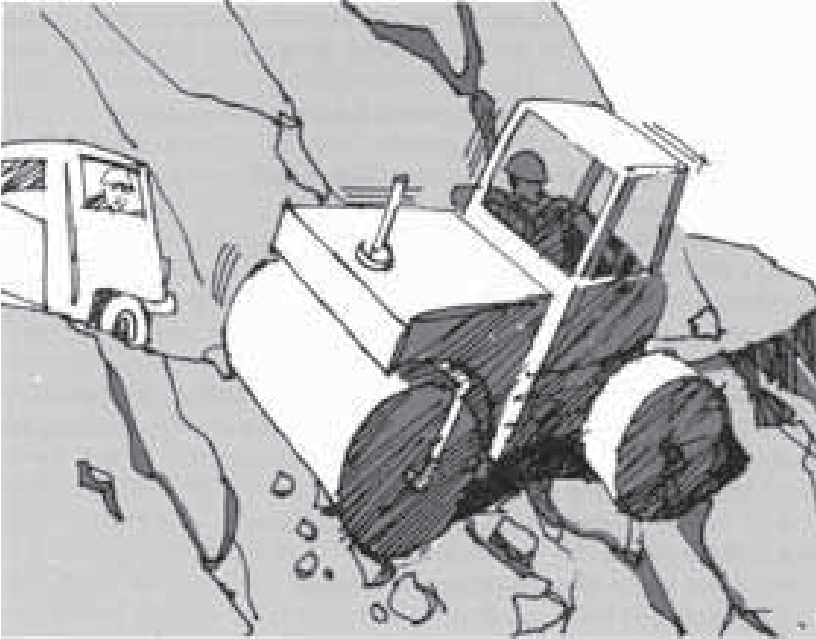
Do – Avoid gear changes on steep sections. Remember that a missed gear change may result in loss of control and the roller overturning. Hand or parking brakes should not be relied on to maintain control.

Do – Park on the flat. If you must park on a slope, chock your wheels.

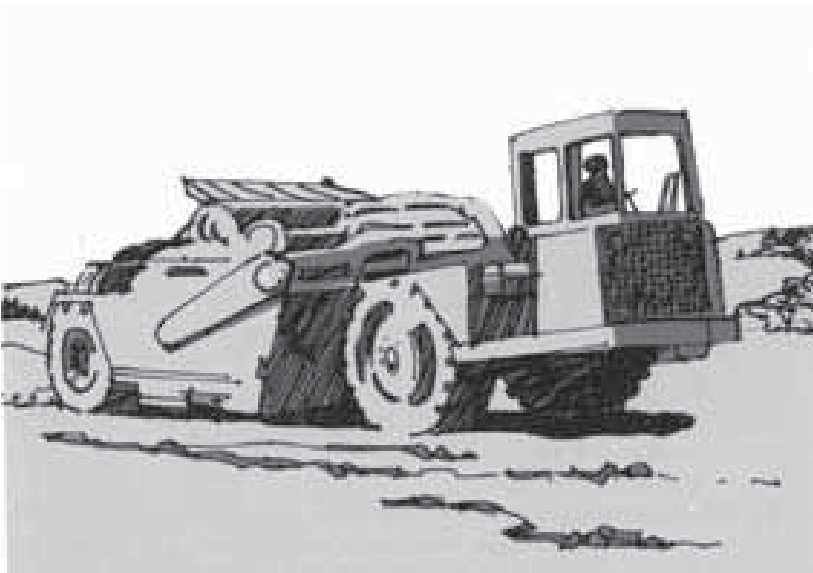
Don't – Climb onto a moving roller.

4.10 Ancillary Equipment

Roll-Over Protection. Every year an average of three operators are killed in machine roll-overs. The types of construction plant which are most prone



Take care not to over-balance near the edges of roads.



Scraper equipped with roll-over protection

to roll over, and which should be fitted with a roll-over protective structure and a seatbelt to restrain the operator, are:

- (a) Wheeled and crawler tractors, loaders and dozers;
- (b) Motor graders and scrapers;
- (c) Self-propelled rollers and compactors with a weight of 2700 kg or more.

Supplementary Steering Systems. The above plant items should have a steering system such that in the event of the engine stopping the operator is able to steer the machine to a position of safety. If this cannot be achieved, a supplementary steering system should be fitted, if feasible.

Amber Flashing Lights. To improve their visibility to motorists, the following plant items should be fitted with amber flashing lights (cab-mounted where possible):

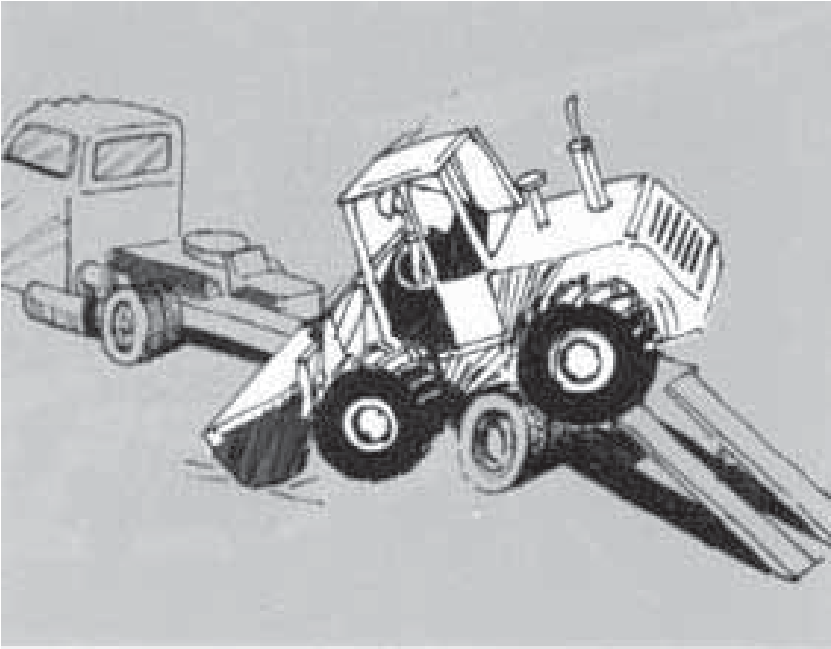
- (a) Maintenance graders;
- (b) Front-end loaders for road maintenance works; (c) Street sweepers and washers;
- (d) Road verge lawnmowing equipment;
- (e) Road marking machines;
- (f) Road maintenance vehicles.

These machines are often met unexpectedly by other traffic on public roads, and because of the type of work they do they are not normally protected by stop/go paddles or warning signs.

4.11 Loading Plant onto a Transporter

Loading a machine onto and off a transporter is a hazardous operation. Make sure you know and follow the manufacturer's recommended procedure.

- (a) Load and unload on stable, level ground. Apply the brakes of the transporter and chock its wheels to prevent movement. Make sure that portable loading ramps are reasonably clean, firm, secure, and in line with the deck.
- (b) Carefully line up the machine with the ramp and transporter. Position the machine so that its weight is correctly distributed on the transporter.
- (c) Lower all attachments, lock the brakes, chock the wheels or tracks and secure the machine with cables or chains of adequate strength.
- (d) When loading disabled machines or heavy plant with winches, take care that the winch speed is low enough for the operator of the machine being loaded to maintain control of the machine.



Follow the manufacturer's recommendations when loading plant onto or off a transporter.

- (e) When side loading, ensure that blocks are placed under both sides of the transporter to prevent swaying.
- (f) Make sure you are familiar with the hand signals used in the loading and unloading of machines.
- (g) Always wear the seatbelt when a roll-over protective structure is fitted.

4.12 Driving Hints

Always drive defensively. Carry any attachment or bowl low for good stability and visibility while travelling. Watch for dangers, such as overhanging trees, banks, falling rocks, or overhead power lines.

Turn your machine's lights on whenever visibility is poor. You must be able to see clearly and other traffic must be able to see you.

4.13 Parking

The rules for safe parking are:

- (a) Park on level ground wherever possible. If it is necessary to park on a slope, park at right angles to it.



Turn machine's lights on when visibility is poor.



Never rely on the handbrake to hold a machine.

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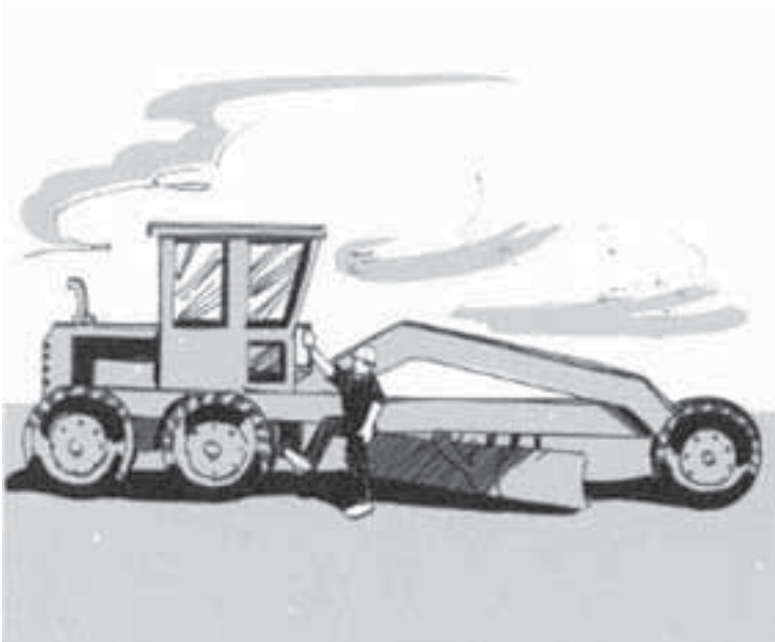
- (b) Don't rely on a handbrake to hold a machine even on an uphill slope. A handbrake cannot be relied on to hold a machine with its motor running and in gear. Never leave a machine unattended in this condition. Follow the manufacturer's parking instructions.
- (c) Park clear of roadsides if possible. Where any part of a machine projects onto a road, it must be protected by barriers and warning lights.

4.14 Shutting Down

When shutting down, lower all attachments to the ground, switch off the engine, lock the transmission, and set the parking brakes.

Chock the wheels if the machine is to be left on an incline. Don't forget to remove the machine's keys if these are used.

When dismounting from the machine, don't jump. Move carefully and use the handholds to avoid slipping or falling.



Use the handholds to avoid slipping or falling when dismounting. Don't jump.

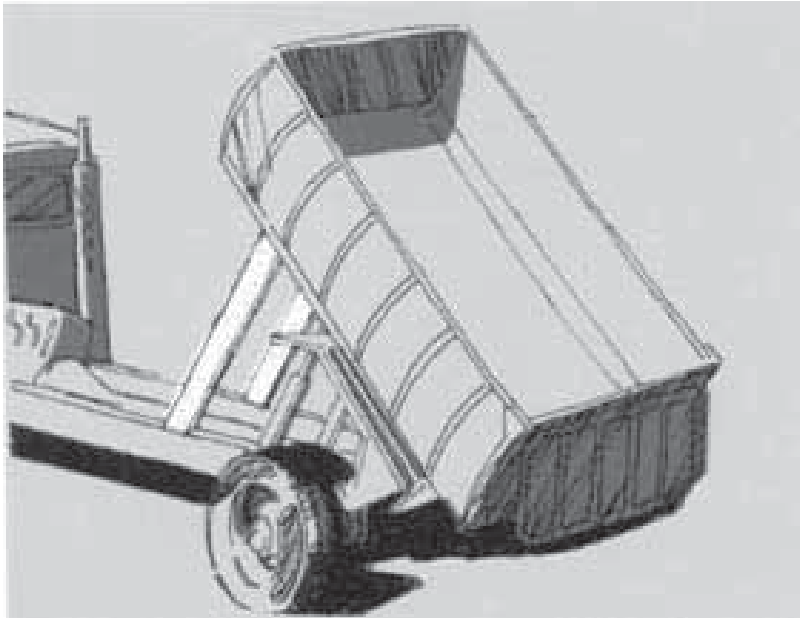
5: Truck and Plant Maintenance

5.1 General

A systematic preventative maintenance programme should be established for all trucks, plant, and vehicles. Such a programme, based on either the distance travelled or the hours the equipment is operated, determines when periodic checks are made, oil changed, tyres rotated or replaced, and minor and major overhaul jobs undertaken. The programme will reduce accidents and delays and will save money by preventing excessive wear and equipment breakdown.

5.2 Servicing Under Equipment

Always prop a raised truck tray, scraper apron, or loader bucket before carrying out an examination or servicing underneath it. Accidents have occurred where equipment has fallen suddenly, killing or seriously injuring the person working beneath it.



Block the truck's raised tray when servicing under the machine.

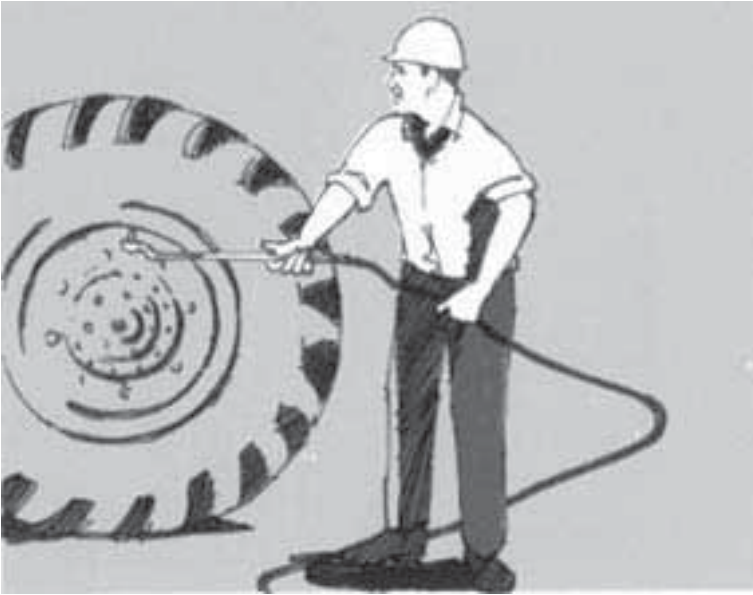


Cage tyres before carrying out the initial inflation.

5.3 Tyre Removal, Assembly, and Inflation

Incorrect methods of removing, assembling, and inflating tyres have caused many serious injuries. Split rings can be blown apart or locking rings blown off violently during inflation. The following precautions are suggested:

- (a) Do not remove detachable flanges or locking devices from any wheel until the tyre has been deflated and the valve core taken out.
- (b) Do not assemble unless the flanges, rings and grooves are clean and undamaged.
- (c) Place a suitably designed guard in position before a tyre is inflated to screen the wheel.
- (d) Inflate the tyre to a pressure of approximately 100 kPa (15 psi). At this stage, check flanges and rings for proper seating.
- (e) Continue inflation under the protection of the guard, avoiding over-pressure. Do not leave the air line attached to the valve and unattended.



When inflating a tyre always stand to one side where possible. Position the wheel alongside a concrete wall or similar barrier.

5.4 Refuelling

Do not store fuel in the cab. Extinguish cigarettes and shut off the engine before refuelling starts. Make sure the fuel cap is replaced securely.

6: Minor Plant and Equipment

6.1 General

Most accidents with minor plant and equipment are caused by improper usage and poor maintenance. Equipment should be used only by workers who have been instructed in safe working procedures and the dangers of misuse. All equipment should be cleaned, tested, and inspected regularly. Worn or damaged parts should be replaced or repaired before use.


Maintenance workers must wear gloves, safety shoes, and safety glasses as appropriate. Safety equipment, such as transmission guards, must be kept in place.

6.2 Extension Leads

Extension leads used with portable equipment should be inspected before use. Damaged leads should not be used until repaired. Temporary repairs of damaged leads by taping is not acceptable.

Leads must not be used knotted or coiled up, placed where traffic can run over them or people trip over them, or be laid out through water.

The equipment and lead should be protected:

- (a) With an isolating transformer or portable generator providing a supply isolated from earth; or
- (b) With an earth leakage circuit breaker (acceptable only with a double-insulated tool (symbolised by )); or
- (c) With a monitored earth circuit; or
- (d) Supplied from a power source of no more than 32 volts.

Portable equipment should be tested at regular intervals by a suitably qualified electrician. Temporary switchboard installations must be checked by a suitably qualified electrician at least once every three months.

Tag or label all faulty equipment: NOT TO BE USED.

6.3 Pneumatic Tools

Always use pressure pipes, hoses, and fittings: don't try to "make do". Use hose couplings which will not come apart accidentally and secure the couplings by wiring them together where applicable. Remove leaking or defective hose.



Ensure electrical equipment is properly maintained and protected.

Don't use compressed air for blowing dirt from your hands, face, or clothing. If air is blown onto a minor cut, it can cause a fatal embolism. Air-propelled particles striking the eyes can blind.

Release the pressure in hose lines and disconnect tools before making any adjustments or repairs.

6.4 Concrete Cutting Saws

If you are operating a concrete cutting saw, wear approved hearing protection to avoid hearing damage from sustained high noise levels. Also wear eye protection and safety footwear, and a dust mask if you are dry cutting.

When replacing cutting blades, ensure that they are the correct rpm for the machine as some blades disintegrate when rotated too fast.

6.5 Chainsaws

Never attempt to use a chainsaw unless you have been trained in its use. Always wear safety footwear, ear protection, and suitable clothing, including a fitted mitt. Torn or loose clothing that could catch in the saw should be avoided.



Never use a chainsaw while standing in a tree.

If you intend to use a chainsaw in an elevated position, do so only from a suitable, stable platform. A chainsaw must not be used from a ladder or from a tree. Never try to operate a chainsaw above chest level – you could lose your head.

Do not carry a chainsaw while the chain is in motion, and cover the blade when transporting the machine to and from work sites.

6.6 Motor Mowers

Inspect the roadside areas to be mowed and note the position of open drains, steep slopes, and rocks. Clear the area of stones and any hard litter and make sure people are well clear before starting work.

Wear safety footwear when operating the mower. Ear and eye protection is also advisable. Keep clear of the blades when starting the machine.

When mowing sloping ground, take care to keep the mower under control. Beware of pushing a mower up a steep slope. If you slip, it may run back over you.



Don't smoke while refuelling – you could cause an explosion.

Before checking blades or removing debris, stop the mower engine and disconnect the spark plug lead. If the machine is electrically powered, unplug the lead before you check the blades.

6.7 Refuelling

Never refuel a petrol-driven machine while the engine is running or hot, or in the vicinity of an open flame. Always refuel outdoors, not inside a building. Never store fuel in plastic containers.

7: Survey Parties

7.1 Work on Roadways

When you are surveying on any trafficked roadway ensure that warning and information signs and cones are set out in accordance with the *Manual of Temporary Control of Traffic*, in order to protect the survey party, the survey equipment, and the public. Conspicuous clothing should be worn (see table 1 p 62 for general road workers).

7.2 Power Lines

When using staffs, tapes, or chains near overhead power lines, be careful to avoid contact with them, particularly when clearing tape or band snags.



Protect your survey party with adequate signing and protective equipment.

7.3 Fences

If you have to climb a fence, do so empty-handed. Pass equipment over or through the fence. Be able to recognise electrified fences.

7.4 River Crossings and Difficult Country

When a river crossing is necessary, carefully consider alternative crossing locations. If it appears that the river can be forded only with difficulty, everyone crossing must wear lifejackets and lifelines must be used. If in doubt do not cross.

When crossing very steep country, every member of the party must be adequately equipped with suitable clothing and boots, and, where falling hazards exist, with ropes and safety harnesses.

7.5 First Aid

At least one member of every survey party must be trained in first aid, and every party should have a first aid kit with them.

8: Excavation of Existing Roadways

8.1 Underground Services

Before starting an excavation, determine the location and depth of underground services using probes, pilot holes or cable locators, and mark their positions. Do not investigate the location of services with mechanical plant. Take steps to protect and support the services and backfill around them carefully.

The usual symbols used to identify various services are:

Gas–G

Electricity–EL

Water–W

Telecommunications–T

Foul sewer–CSS

Oil–O

Stormwater or drainage–SW



Protect pedestrians. Always cover or barricade holes and trenches.

If the positions of these services are marked by the owners, the colours often, but not always, used are: red for power and gas, blue for Post Office services, and green for all other services. Be aware that the positions marked are approximate only and there may be services in the area which are not marked.

8.2 Pedestrian Traffic

Pedestrian traffic must be directed through or adjacent to the work along a clearly defined route which has been barricaded off and which can be safely negotiated by handicapped pedestrians and children.

Where pedestrians are required to cross a trench, use steel, timber, or concrete covers of adequate width for prams and wheelchairs. Keep approaches to the crossings clear of loose materials or other obstructions. Cover or otherwise fence off trenches which may be a hazard to children.

9: Pipe Laying

9.1 Trench Excavation

Important rules when excavating trenches are:

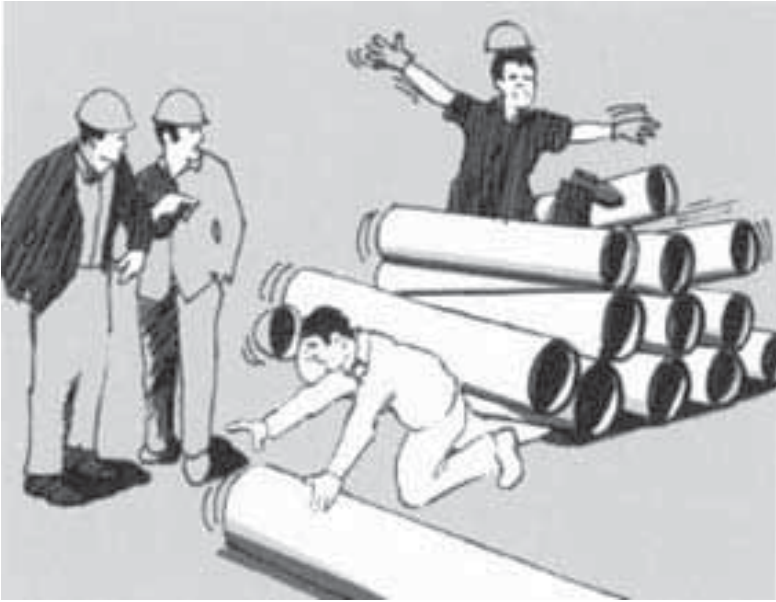
- (a) Every trench over 1.5 m deep should be timbered unless its face has been cut back to a safe slope or the material in the face is of proven good standing quality under all conditions. For further details and timbering safety advice, see Safety in Construction publication No. 5 *Excavation Code of Practice*.
- (b) Mechanical plant or vehicles must not approach closer than what would be the edge of the face if battered. to a safe slope, unless the trench timbering is designed for the effect of the additional load.
- (c) Excavated materials should be kept a minimum of 600 mm from the edge of a trench unless the trench timbering is designed for the increased load and suitable precautions are taken to prevent the material falling into the trench.
- (d) Trenches must be inspected every day before work commences and after heavy rains or any other occurrence which could affect their stability.
- (e) People working in trenches with their heads below the top of the trench must wear protective helmets.
- (f) Workers must be provided with ready access to and egress from the trench by secured ladders or steps.

9.2 Pipe Storage

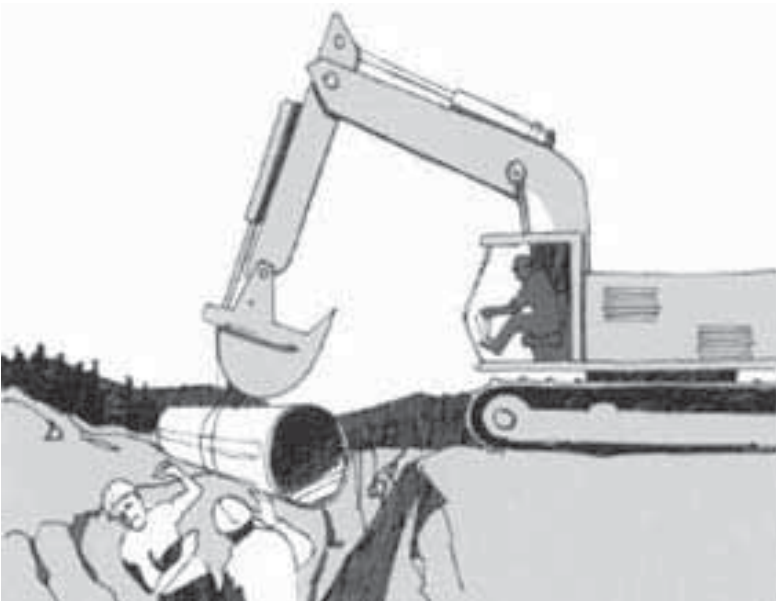
Pipe should be securely stacked and blocked clear of the pipeline. Separate stacks should be made for each size. Insecurely stacked pipe is a hazard. A slight slope, soft ground, vibration, or children interfering with the stack could start the pipes rolling, with disastrous results.

When laying out pipe along an urban roadway, keep intersections, driveways, and walkways clear. Each pipe should be placed in a stable position where children or traffic cannot readily move it.

Archive



'Next time we'll chock the pipes'.



Ensure workers are clear when moving pipes

9.3 Placing of Pipes

Where possible, handle pipes mechanically. Use the lifting lugs on the pipe where they are provided. Ensure that the lifting machine can safely handle the load and that it is on a firm and stable surface while operating.

Gear used should be regularly checked and maintained. It must be of adequate strength for the work proposed (see Appendix 1 (p 64)).

If pipe is to be slung, sling it so that it will be within 5° of the horizontal to avoid slippage. Take special care if you are moving a pipe using two slings. Bumping the pipe or setting down one end may cause a sling to unhook or slip so that the pipe becomes unstable or falls.

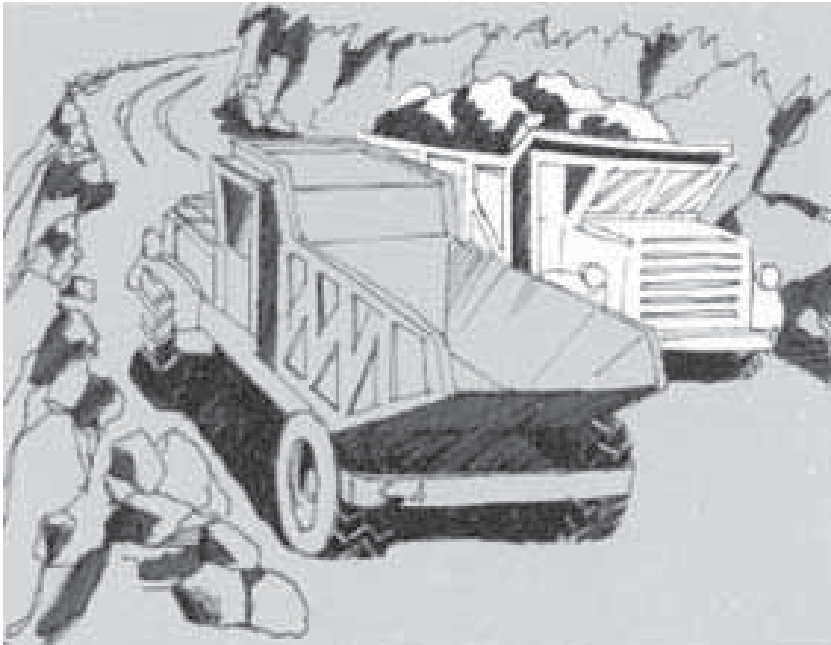
Keep clear of a pipe while it is being unloaded or lowered. Never stand or walk underneath it. Don't start guiding it by hand until it is almost on the bedding.

10: Haul Road Construction

10.1 Accident Causes

The main causes of accidents on haul roads are:

- (a) Excessive speed for the road conditions.
- (b) Inadequate sight distances on corners.
- (c) Inadequate crossing control. Where the site is suitable and the construction traffic warrants it, use temporary traffic control signals at major highway crossings and elsewhere provide traffic signposting as necessary.
- (d) Uncompacted side cast material on sidling roads. Plant and vehicles tip over when they move off the road on to uncompacted material to allow other plant and vehicles to pass. The edge of the sound roadway must be marked.



Give loaded vehicles the right of way on haul roads.

(e) Inadequate road maintenance. Haul roads that are well maintained will be safer, and turnaround times will be quicker. Lay dust down with water or a dilute emulsion in order to maintain visibility.

10.2 Construction

Construct haul roads for safety and economy. Pay particular attention to sight distances and road widths, particularly on corners. Where practical construct a one-way road system to minimise vehicle conflicts. Where this is done, ensure that roads are clearly signposted as “one way” to guide service personnel and others not familiar with the route.

10.3 Old Bridges

Do not assume that old bridges will be adequate. Have them inspected to ensure that they can safely carry the proposed traffic.

11: Road Sealing

11.1 General

Road sealing can be a hazardous operation and adequate protective clothing must be worn (see section 12.7 p. 48). Precautions must be taken to protect workers against bitumen burns and accidents when spray units are reversed.

11.2 Bitumen Burns

Burns are a common injury in road sealing work and all supervisors must know how to treat them (see p. 58 for the recommended treatment details).

A necessary safeguard in case of an accident involving a bitumen burn is a water-filled pressure extinguisher, modified with a fine spray nozzle, which should be mounted in a readily accessible position on the spray unit.



Don't allow any source of ignition to come into contact with bitumen heated to spraying temperature – an explosion could result.

Archive

The fumes which result when heated cut-back bitumen is sprayed onto a pavement are an irritant to the skin and eyes. Avoid prolonged contact with, and inhalation of, the vapour.

All sources of ignition must be prevented from coming in contact with bitumen heated to spraying temperatures. An explosion could result.

11.3 Spray Unit Reversing Accidents

There is always a possibility of the sprayman on the bitumen spray unit being run over while the unit is being reversed. There must be good communication and a sound understanding between, the driver and the sprayman. Visual contact between them is important and is made easier when the spray unit is fitted with large rear vision mirrors.

Spray bars must be activated from the sprayman's footplate and not from the ground unless provision has been made in the machine's design for this operation to be carried out safely.



When spraying, good visual contact is important.

11.4 Maintenance of Spray Units

Spray units must be regularly checked and maintained. Check nozzles daily to see that they are correctly fitted. Unplugging of blocked valves and other maintenance work on bitumen spray units must be supervised by a person aware of the hazards associated with the work and familiar with the safety precautions necessary. (See the Contractor's Federation booklet *Bitumen Safety Guide*, Appendix B, for details).

12: Protective Clothing and Equipment

12.1 General

All supervisors must ensure that suitable protective and, where required, conspicuous gear is supplied to protect road workers from injury and that it is worn. Such equipment must not be a substitute for engineering safeguards to protect workers but as a final barrier against bodily injury. It must be maintained in a sanitary and sound condition.

12.2 Safety Helmets

Protective helmets must be worn in designated areas and in situations where workers could be struck on the head by falling or flying objects and where there is a danger of workers striking their heads.

12.3 Footwear

Safety shoes or boots must be used on all roading jobs.

12.4 Eye Protection

Eye protection should be worn whenever workers are exposed to flying particles, e.g. when:

- (a) Using a chainsaw under windy conditions;
- (b) Driving any earthmoving equipment under dusty conditions;
- (c) Chipping concrete, rock, paint or scale;
- (d) Drilling concrete or rock;
- (e) Spray painting;
- (f) Handling products where there is a danger of liquid entering the eyes;
- (g) Working in areas where small trees or bushes are liable to hit a worker in the face.

12.5 Work Gloves

Suitable protective gloves should be worn when handling rough, sharp-edged or abrasive materials, or when the work may subject the hands to lacerations, burns or irritation caused by contact with chemicals or fuels.

12.6 Hearing Protection

Hearing protective equipment must be supplied to and used by workers required to work near excessive noise. The maximum time that a person can be exposed per day to various levels of noise without suffering hearing damage is given in table 2 (p. 63).

12.7 Protective Clothing Requirements

Protective clothing should be worn over or in place of ordinary working clothing where the conditions of work are such that the protection afforded by ordinary clothing is inadequate. The requirements of various workers are:

General Road Workers, Traffic Controllers and Road Markers. Conspicuous clothing should be worn as listed in table 1 (p. 62).

Sealing Workers. Workers handling bitumen on sealing operations must wear overalls or long trousers and long-sleeved shirts of flannel or woollen material. Trousers must be worn outside boots and socks – not tucked in.



Always use the protective equipment provided.

Archive

Workers handling hoses, valves, hatches and clips should wear thick, soft leather or fabric heat-resistant gloves. Gloves should have a tightly fitting wrist band without flared gauntlets.

Workers filling or discharging bitumen tankers must wear fullface type eye shields.

All sealing workers should wear heavy-duty safety working boots or safety gumboots. Under no circumstances should light shoes, thongs, sandals or moccasins of any kind be worn.

Workers Handling Petroleum Products. Workers handling liquid petroleum products should wear clean overalls and PVC coated flexible gloves. Goggles should be worn if there is a danger of liquid entering the eyes.

Workers Handling Lime and Cement. Workers operating bulk spreaders and handling bagged lime and cement are vulnerable to skin irritations and burns. When quicklime is being handled, particular care must be taken because of the aggressive nature of the material and dust masks should be worn.

Workers should wear goggles, overalls or long trousers, long-sleeved shirts, gauntlet-type gloves and a hat or cap. Avoid tightly fitting clothes around



Wear protective equipment when handling lime or cement.

Archive

the neck and wrists as chafing in the presence of lime can cause skin irritation. Trousers legs should be tied over boots.

Attention to personal hygiene is important. Workers should shower and change their clothing daily. The skin must not become heavily contaminated with lime or cement for long periods. Barrier creams provide useful protection to exposed parts of the body.

Weedsprayers. Workers involved in roadside weedspraying operations are liable to health problems through inhaling or absorbing through their skin the toxic chemicals being sprayed.

Workers should wear overalls, waterproof gloves and footwear. Waterproof protective clothing should replace overalls on very windy days. Workers must avoid spray drift and wear respiratory protective equipment appropriate to the herbicide being sprayed. Herbicide labels will indicate the extent of the hazard. Contact the supplier or the Department of Health for the type of respiratory equipment required.

Personal hygiene is important. Hands should be washed before smoko and meal breaks and on completion of spraying. A daily shower is recommended.

13: Housekeeping and Other Safety Measures

13.1 General

Confusion will be reduced and operations will be more efficient when the work area is orderly and tidy. Tidiness and safety of movement go hand in hand. Untidiness causes accidents – for example, workers trip over objects, slide on greasy surfaces, cut their hands on projecting nails, or walk into misplaced or poorly stacked materials. Vehicles run over or back into materials, plant or workers.

13.2 Housekeeping Rules

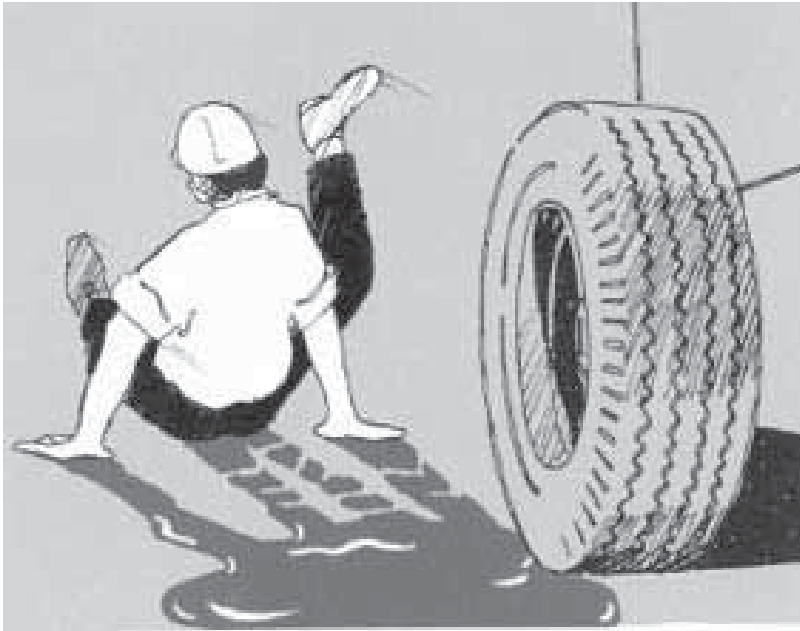
Following these general rules will make road works safer and reduce the chance of accidents:

- (a) Define to the fullest extent possible the site roadway and worker and public access routes. Workers have been run over by trucks or plant which they have not heard approaching because of site noise or other distractions.
- (b) Locate plant and materials in areas which do not obstruct traffic or limit driver vision.
- (c) Store materials in an orderly manner that will prevent them falling and spreading. Provide easy access to them.
- (d) Clean up all spills of oil etc. or sprinkle them with sand. Areas which have become waterlogged or churned up, and over which people, plant and machinery have to pass, should be provided with a sound working surface by drainage improvement, metalling or other means.

13.3 Fire Safety

No smoking or naked flame should be permitted near fuel or oil storage areas or where such goods are dispensed. Decanting of flammable liquids and the refuelling of portable plant should be done outdoors.

Do not allow waste material to accumulate on a site. Rubbish drums should be provided as necessary. Rubbish should be regularly removed from the site or be burned in an incinerator a safe distance from any flammable material.



Avoid accidents. Clean up oil spills.

13.4 Sanitation

Contagious diseases are often spread by poor sanitation on a job. Unless satisfactory facilities are available, the first task on a roading project must be to provide adequate sanitary facilities.

Where practical, flush toilets should be connected to public sewage systems. If this is not possible, pit privies or approved chemical toilets may be used as required by the local authority. Where pit privies are used, the pan should be fitted with a flyproof double-flap seat. A supply of disinfectant should be provided for use as necessary. Toilet paper must be provided and hand washing facilities located nearby.

14: Safe Use of Explosives

14.1 Supervision

Every blasting operation must be supervised by a certificated safety supervisor, and the person employed to prepare and lay the charges must hold a certificate of competency as a construction blaster. Both jobs can be done by the same person.

14.2 Storage

Detonators and explosives must be kept in separate locked containers in a licensed explosives magazine. Only sufficient quantities for daily use should be taken from the magazine to the site. On site they must be kept separate, secure, protected from the weather and a safe distance from vehicular or pedestrian traffic and from mechanical, physical and electrical hazards.



Take adequate safety precautions when blasting. Follow the blasting code and avoid accidents.

14.3 Access Control

All access points leading to the area where construction blasting works are carried out must be manned to prevent entry during blasting. If through traffic is involved, display warning signs and provide traffic control in accordance with the *Manual on Temporary Control of Traffic*. An agreed warning signal must be given before a blast. When the construction blaster has determined that conditions are safe after the blasts, an all-clear signal should be given.

Detailed technical and handling requirements for blasting operations are outlined in Safety in Construction publication No. 4 *Blasting Code*, and must be followed.

15: First Aid

15.1 General

First aid kits must be readily available to workers on a job and a copy of a comprehensive first aid publication (such as Safety in Construction publication No. 6 *First Aid*) should be included with each kit.

All supervisors should be trained in first aid and other workers should be encouraged to do so. Training courses are provided by the Red Cross and the St John Ambulance Association. Basic advice and a description of recommended kits is contained in the above booklet.

15.2 Treatment

The treatments described below should be carried out only in emergencies. Unless minor cuts are being treated, medical aid should be obtained as soon as possible. In many situations where the patient's injuries are serious and medical attention is required, it is often quicker to get an ambulance to come to the site than to locate a doctor and obtain treatment from him or her.



Be equipped and train your staff in first aid.

Archive

Before treating wounds, burns or eye injuries, always wash your hands and if possible rinse them in an antiseptic solution.

15.3 Bleeding

Remove loose dirt from the wound only if it can be brushed off. Do not wash the wound. Apply a sterile dressing and press lightly but firmly down. Cover with a pad of soft material then apply a bandage. If this does not stop the bleeding, bind a second pad over the top, bandage more firmly and seek urgent assistance.

15.4 Rescue Breathing

If a patient is not breathing, place him on his back, ensure a clear airway by turning head to one side, clear mouth of dentures, mucus or vomit with your finger, then tilt head well back. The patient may start breathing. If not, seal your lips over the patient's mouth, pinch his nostrils with your fingers and blow in, until his chest is seen to rise. Remove your mouth and watch his chest fall. Listen for air to come out. Repeat at your normal breathing rate. If his chest does not rise, check that his airway is clear and the head is well back. Keep a constant check on his pulse and continue rescue breathing.



Know what to do if a person stops breathing.

15.5 Heart Stopped

If the heart has stopped, carry out external compression of the heart by pressing down from 25 to 40 mm on the person's lower breast bone with the palm of the hand, once per second. Do it six to eight times, then stop and inflate the person's lungs. Continue this cycle. If two people are available, one can do the external heart compression and the other the mouth to mouth resuscitation.

15.6 Shock

A severely injured person becomes cold and clammy. Wrap the patient with blankets but be very careful not to overheat him. Try to provide shelter but do not move the patient unnecessarily. Hot sweet tea is beneficial and may be provided as long as the person is not suffering serious injuries which may require an anaesthetic if he is sent to hospital. Do not give him alcohol.

15.7 Fractures

Splint fractures before moving. It helps to bind two legs, together or to bind a fractured arm to the chest. Splints are easily improvised and should extend far enough to immobilise the joints above and below the fracture. If you suspect a fracture of the back, never move the victim except in an extreme emergency. This could damage the spinal cord and leave the victim permanently paralysed. Cover him with a blanket and try to keep him calm.

15.8 Unconsciousness

The unconscious victim is in danger of suffocation by inhaling his own blood or vomit. Place the victim in a comfortable position on his side to allow blood, vomit or mucus to drain away. Treat the patient as for shock and consult a doctor even if consciousness is very quickly regained.

15.9 Eye Injuries

If there is a foreign body in the eye, wash it out with plenty of water. If this does not remove it, do not dig around in the eye. Cover it with a gauze and take the patient to a doctor. A chemical splash in an eye, whether acid or alkaline, should be washed out immediately with plenty of water for several minutes. Prompt action is essential.

15.10 Bitumen Burns

If hot bitumen contacts the skin, do not attempt to remove the bitumen unless it is blocking the victim's airway. Once the bitumen has cooled it will do no further harm, and in fact it will provide a sterile dressing for the burnt skin below.

Drench the burnt area from the water-filled extinguisher mounted on the spray unit or in cold running water. If possible, the burn should then be immersed in cold water containing ice cubes.

In the case of burns to areas not easily immersed in water, such as the head and neck, shoulders, chest and back, apply towels which have been soaked in a bucket of cold water (iced if possible). Continue the water treatment until pain is relieved, that is, when pain is no longer felt when the burnt area is removed from the water.

If hot bitumen enters the eye, flush it out with cold water for approximately 20 minutes. Follow this with castor oil eye drops if available. Again, do not attempt to remove the bitumen,

Do not prick blisters, or apply lotions or ointments. Cover the burn with a sterile dressing and lightly bandage to exclude the air.

Treat the victim for shock by keeping him comfortable and warm, with plenty of fresh air. Give him small amounts of hot liquid such as tea or coffee if he wishes, provided there are no other injuries such as fractured limbs which may require a general anaesthetic when the patient is hospitalised. Do not give alcoholic beverages of any kind. After giving first aid treatment at the site, ensure that he receives appropriate medical treatment. If the burns seem serious, call an ambulance promptly.

15.11 Other Burns

Treat other burns in the same way as bitumen burns—that is, apply cold water immediately and copiously. Do not attempt to remove the victim's clothing.

16: Summary of Act and Regulations

16.1 Object of Construction Act 1959

The Construction Act 1959 binds the Crown and provides for the safety and welfare of workmen engaged in construction work.

16.2 Duties of Construction Safety Inspectors

Construction safety inspectors appointed under the Construction Act 1959 have as their principal functions to promote the safety and welfare of workmen on construction work, to advise on safe practices, to investigate accidents, to ensure compliance with the Act and Regulations, and to take all such steps as may be desirable to reduce accidents.

Inspectors are located in district offices of the Department of Labour and work under the technical direction of the Chief Construction Safety Engineer in Head Office. They are Government officers and should not be confused with local body building inspectors or the employer's safety supervisors.

16.3 Application of the Act

The Act applies to construction work carried out by trade or business or in the exercise of the employer's functions or for the purpose of any industrial or commercial undertaking. The safety of other persons lawfully in the vicinity of the work is also covered by the Act.

Voluntary "working bees" or "do-it-yourself" persons erecting a building where paid workmen are employed at times during the progress of the work also come under the Act. Householders who undertake the odd job about their premises in their spare time are exempt.

16.4 Liability of Employers

In every case where under the Act any requirement, obligation, rule, or provision is imposed or enacted or required to be observed with respect to or in connection with any construction work, the employer shall cause the requirement, obligation, rule, or provision to be duly and faithfully complied with or observed, and if the requirement, obligation, rule, or provision is not duly and faithfully complied with or observed the employer commits an offence against the Act.

It should be noted that where mechanical plant including an operator is hired, the hirer is an employer.

16.5 Duties of Workers

Every worker employed by an employer commits an offence against the Act who:

- “(a) Fails to comply with any requirement under the Act, or any regulations made under the Act, relating to the performance of any act by him; or
- “(b) Without reasonable cause does any act or thing likely to endanger himself or any other person; or
- “(c) Wilfully or negligently disregards any instructions given to him by an authorised person for the purpose of securing the observance of the Act or any regulations made under the Act; or
- “(d) Without reasonable cause interferes with or misuses any appliance, apparatus, clothing, convenience, device, equipment, guard, or other thing whatsoever, provided for securing the health, safety or welfare of any person; or
- “(e) At any time when the circumstances for which it is provided arise, fails or neglects to use any appliance, apparatus, clothing, device, equipment, guard, or thing provided as aforesaid.”

16.6 Safety Supervisors

Safety supervisors are suitably qualified persons appointed in writing by the employer to personally supervise any notifiable work or material part of any such work that they have been appointed to. The name of the safety supervisor must be made known to all workers employed on the work in respect of which any such supervisor has been appointed.

It is the duty of every safety supervisor to ensure that the safety provisions of the Construction Act and Regulations are complied with in respect of the work for which he is appointed, and, if he discovers any breach of any such provision or regulations, he must report that defect to the employer. The safety supervisor must remain on duty on the site of the construction work during such periods as may be necessary to ensure that the work is carried out in accordance with the provisions.

A construction safety inspector may, if he thinks fit, give directions in writing to the employer that the safety supervisor shall be on duty for such hours and in such circumstances as he might specify.

16.7 Notifiable Construction Work

There are two categories of construction work: notifiable and non-notifiable. The essential difference is that one is likely to be more dangerous than the other and is designated notifiable work. It must be remembered that all construction work, notifiable or nonnotifiable, must be carried out in such a way that ensures that the provisions of the Act and Regulations are complied with.

It is the responsibility of the employer to ensure that the Department of Labour's construction safety inspector is notified at least 24 hours prior to the commencement of any notifiable construction work. Forms for this purpose are available from all Department of Labour offices.

Notifiable work includes the excavation of a trench where workmen are required to work in a restricted space which is more than 1.5 m deep and which has a depth greater than the horizontal width at the top.

16.8 Notifiable Construction Accidents

In every case where there occurs in connection with any construction work an accident causing death or serious injury or illness, that is, any accident or illness likely to prevent the sufferer from returning to work for at least 48 hours, written notice of the accident must be given to the inspector not later than 48 hours after it has occurred.

Except for the purpose of saving a life, preventing further injury or illness, or preventing serious danger to life or property, the part of the construction work where the accident occurred shall not, if a continuance of the work is likely to prevent discovery of the cause of the accident, be interfered with; and no person shall do any act likely to prevent the discovery of the cause of the accident until authorised by an inspector.

The purpose of the notification and subsequent investigation is to endeavour to prevent a similar type of accident or illness occurring.

***Table 1: Conspicuous Protective Clothing Requirements
For Road Workers Subject to Traffic Risks***

Class of worker	Day	Night	Inclement weather
General road workers	Overalls or vest, jacket or poncho made from fluorescent or reflective material	Vest, jacket or poncho either made from fluorescent or reflective material or trimmed with a 50 mm band of reflective material.	Wet weather equivalents
Traffic controllers	Three-quarter length coat	Three-quarter length coat and vest, jacket or poncho either made from fluorescent or reflective material or trimmed with a 50 mm band of reflective material.	Wet weather equivalents
Road markers	Overalls	Overalls and vest, jacket or poncho either made from fluorescent or reflective material or trimmed with a 50 mm band of reflective material	N.A.
<p>Colour range of protective clothing: Overalls – General road workers: yellow to red-orange – Road markers: white or yellow to red-orange Coat – Traffic controllers: white Vest, jacket and poncho: yellow to red-orange Band: White or silver.</p>			

Table 2: Construction Site Noise

Maximum time that person can be exposed to a specified noise level per day without hearing damage	Sound level	Typical noise range for equipment item
8 hours	85dB(A)	The level at which a person must raise his voice to be heard 300 mm away.
4 hours	88dB(A)	Noise levels found in the non-soundproofed cab of a grader. Operators of same should wear ear plugs.
2 hours	91dB(A)	
1 hour	94dB(A)	
1/2 hour	97dB(A)	Noise levels experienced in the non-soundproofed cab of a D7 bulldozer. Operators of same should wear ear muffs.
15 minutes	100dB(A)	Chainsaw. Measurement taken at the operator's ear. Operators should wear ear muffs.
8 minutes	103dB(A)	
4 minutes	106dB(A)	
2 minutes	109dB(A)	Noise level 1 m from hammer. Operators should wear at least grade 3 ear muffs.
1 minute	112dB(A)	
30 seconds	115dB(A)	

Persons should not be exposed to any noise level exceeding 115dB (A) (measured with the slow response of the sound level meter) without wearing personal hearing protection.

Appendix 1: Strength of Pipe Lifting Gear

The following rope SWLs should be used when pipe is to be lifted with a fibre or wire rope strop used as a single vertical hitch. Where a single chocker hitch is to be used, use SWL values of 75% of those shown. Use strops with thimbles.

Where the pipe is to be lifted in other than either of these ways, or if detailed information on slings and slinging is required, refer to Safety in Construction publication No. 26 *Rigging Code of Practice*.

1.1 Fibre ropes:

Diameter (mm)	14	16	18	20	22	24
SWL (kg)	233	304	386	476	576	685

These SWLs are for new manilla fibre rope. Where sisal fibre rope is used, use 80% of the SWL listed.

1.2 Wire ropes:

Diameter (mm)	9	13	16	19	22
SWL (kg)	800	1700	2500	3500	4800

These safe working loads are based on Grade 180 steel with a factor of safety of 6 for new ropes.

Ropes of other quality should have their SWLs set according to their minimum breaking loads.

2. High-Tensile Dee shackles: (to BS 3032)

Shackle size (Diameter of pin in mm)	13	16	19	22
SWL (kg)	500	750	1500	2000

Archive

District Offices of the Department of Labour

WHANGAREI	PALMERSTON NORTH
TAKAPUNA	LOWER HUTT
AUCKLAND	Masterton
MANUKAU	WELLINGTON
HAMILTON	NELSON
TAURANGA	Blenheim
ROTORUA	Greymouth
GISBORNE	CHRISTCHURCH
NAPIER	TIMARU
Hastings	DUNEDIN
NEW PLYMOUTH	INVERCARGILL
WANGANUI	

District offices shown in capitals are headquarters of construction safety inspectors appointed under the Construction Act 1959. These inspectors serve in addition the other districts listed above.

Safety in Construction Publications

The publications below are obtainable from any Department of Labour office:

No. 1	<i>A Short Guide to the Construction Act 1959</i>
No. 3	<i>Scaffolding Code of Practice</i>
No. 4	<i>Blasting Code of Practice</i>
No. 5	<i>Excavation Code of Practice</i>
No. 6	<i>First Aid Practice on Construction Work</i>
No. 7	<i>Falsework Guide</i>
No. 15	<i>Underwater Diving Code of Practice</i>
No. 16	<i>Powder-Powered Tool Guide</i>
No. 18	<i>Work in Compressed Air Code of Practice</i>
No. 19	<i>Safety Supervisor's Guide</i>
No. 20	<i>Safe Use of Electricity</i>
No. 21	<i>Portable Mechanically-Powered Nailers and Staplers Guide</i>
No. 22	<i>Asbestos Guide</i>
No. 23	<i>Safety in Demolition Work</i>
No. 24	<i>Code of Practice for Cranes and Lifting Appliances</i>
No. 25	<i>Road Works Safety Guide</i>
No. 26	<i>Code of Practice for Rigging Work</i>