ILO CONSTRUCTION OS&H

A free, comprehensive, international, digital training package in occupational safety and health for the construction industry

THEME SUMMARY 12: HORIZONTAL MOVEMENT

(Photo: Richard Neale. Permission given by the operator and www.carillionplc.com)

Summary of content

1 PREFACE

This Theme Summary describes the processes of moving materials, components, plant, equipment, people and all other items that have to be moved within and around a construction site. The design, maintenance and inspection of the plant and equipment in these processes are described in the Theme Summary 10: "General plant and equipment".

This Theme Summary follows the relevant structure and content of the "ILO Code of Practice: Safety & health in construction" (the "Code"). The following passage is taken from this Code:

"1. General provisions

1.1. Objective

1.1.1. The objective of this code is to provide practical guidance on a legal, administrative, technical and educational framework for safety and health in construction with a view to:

> *(a) preventing accidents and diseases and harmful effects on the health of workers arising from employment in construction;*
>
> *(b) ensuring appropriate design and implementation of construction projects;*
>
> *(c) providing means of analysing from the point of view of safety, health and working conditions, construction processes, activities, technologies and operations, and of taking appropriate measures of planning, control and enforcement.*

1.1.2. This code also provides guidance in the implementation of the provisions of the ILO Safety and Health in Construction Convention, 1988 (No. 167), and the ILO Safety and Health in Construction Recommendation, 1988 (No. 175)."

Other passages from this Code are included in this Theme Summary, and they are shown in the same format as above.

This Theme Summary also includes extracts from the ILO's "Safety, health and welfare on construction sites: A training manual" (the "manual"). Further details of this manual and the Code are given in Section 10 below "Relevant elements of the Knowledge Base".

This Theme Summary follows the sections shown in the table above.

2 COMMON HAZARDS WITH HORIZONTAL MOVEMENT

Moving materials, components and items of plant and equipment horizontally should create no hazards for anyone on a construction project. Many of the hazards that do arise have the following causes:

- Poor mechanical design (breaks in use, not powerful enough, components fracture or malfunction)
- Poor functional design (not properly designed for the stated purpose)
- Poor workplace design
- Signalling systems (manual, mechanical, electronic) malfunction
- Misuse (not used as designed)
- Loads insecurely attached
- Release of pressure (concrete pumps)
- Poor maintenance (breaks or emits noxious gases)

These cause the following hazards:

- Loads fall from vehicles
- Crushing due to impact of moving or toppling plant and equipment
- Impact from release of pressure (e.g. concrete exploding from concrete pump hose failure)
- Falling from plant and equipment
- Falls caused by swinging loads, plant and equipment
- Limbs or bodies caught in machinery
- Poor ergonomics
- Physiological and psychological damage through repetitive work
- Stress caused by poor environment (noise, heat, poor ventilation, chemicals, noxious gases)

These are, of course, just some of the main hazards; there are many more which are specific to particular projects.

3 GENERAL PRINCIPLES OF SAFETY FOR MOVING PLANT

"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.

Inspect your machine before starting work.
Keep your windows and mirrors clean and avoid accidents."

[Taken from Safety in Construction No. 25. ROAD WORKS SAFETY GUIDE Department of Labour, Wellington New Zealand: http://www.osh.govt.nz/order/catalogue/archive/roadworksafety.pdf. **Construction OS&H** has used a number of extracts from this very good Guide, for which the ILO is very grateful. The Department of Labour web site states (on 27 04 2010) "download pdf copies free" and goes on to give advice on how to download them and use them, so ILO has presumed that this documents is in the public domain for copyright purposes.]

6.1.2. The drivers and operators of vehicles and earthmoving or materials handling equipment should be medically fit, trained and tested and of a prescribed minimum age as required by national laws and regulations.

Hours of work must be controlled. Driving and using moving plant safely requires concentration and long hours make this difficult.

6.1.3. On all construction sites on which vehicles, earthmoving or materials handling equipment are used:

> *(a) safe and suitable access ways should be provided for them;*
>
> *(b) traffic should be so organised and controlled as to secure their safe operation.*

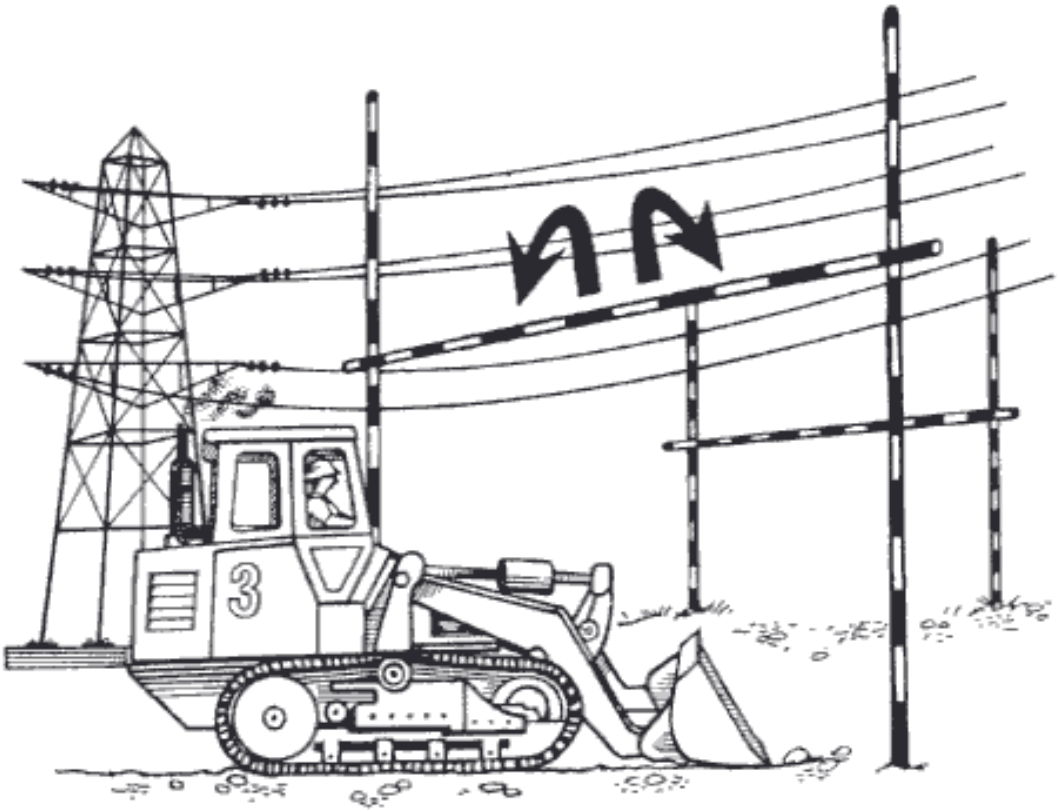
When construction plant, equipment and vehicles have to travel through densely populated public areas, they should be escorted by a banksman (perhaps two banksmen in some circumstances) at all times. The photo below shows two banksmen escorting a vehicle in a busy street.

(Photo: Richard Neale. Paving project, Cardiff, UK.)

6.1.4. Adequate signalling or other control arrangements or devices should be provided to guard against danger from the movement of vehicles and earth-moving or materials-handling equipment. Special safety precautions should be taken for vehicles and equipment when manoeuvering backwards.

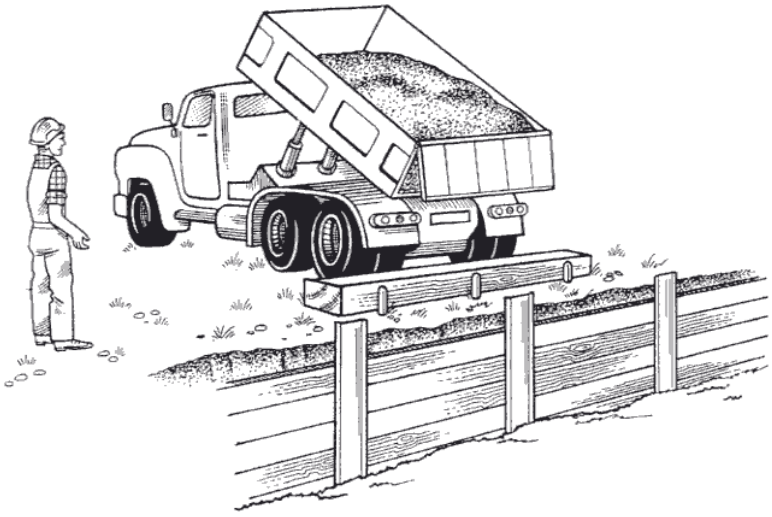
6.1.5. The assistance of a trained and authorised signaller should be available when the view of the driver or operator is restricted. The signalling code should be understood by all involved.

6.1.6. When earth-moving or materials-handling equipment is required to operate in dangerous proximity to live electrical conductors, adequate precautions should be taken, such as isolating the electrical supply or erecting overhead barriers of a safe height.



If routes have to approach overhead structures or overhead power lines, contact with them can be avoided by erecting warning barriers of the goalpost type. The crossbar should be of rigid material, preferably timber, and painted in two contrasting warning colours. In the case of power lines, there should be a barrier on both sides of the line and set at least 6m horizontal distance away. Operating a crane in the area of overhead power lines requires arrangements to be made in advance with the power company for power to be diverted or cut off whenever the crane is in use.

6.1.7. Preventive measures should be taken to avoid the fall of vehicles and earth-moving or materials-handling equipment into excavations or into water.



6.1.8. Vehicles and earth-moving or materials-handling equipment should not travel on bridges, viaducts, embankments, etc., unless it has been established that it is safe to do so.

6.1.14. When cranes and shovels are being moved, out of service, the boom should be in the direction of travel and the scoop or bucket should be raised and without load, except when travelling downhill.

6.1.15. On earth-moving and materials-handling equipment, motors, brakes, steering gear, chassis, blades, blade-holders, tracks, wire ropes, sheaves, hydraulic mechanisms, transmissions, bolts and other parts on which safety depends should be inspected daily.

6.1.17. Deck plates and steps of vehicles and equipment should be kept free from oil, grease, mud or other slippery substances.

6.1.16. Vehicles and earth-moving or materials-handling equipment should not be left on a slope with the engine running.

Sites should be securely fenced to protect the public from moving construction plant and equipment. The photo below shows very secure, double fencing around a site near a popular public footpath.

(Photo: Richard Neale)

Warning notices should be displayed prominently.

(Photo: Richard Neale)

4 EXCAVATING PLANT

Falls of vehicles into excavations or openings occur frequently when vehicles get too near the edge of an excavation and cause the side to cave in, or when in tipping materials over the edge the driver approaches too close and cannot stop in time. The precautions are barriers, banksmen and fixed stops.

6.2.13. Before leaving the excavator the operator should:

(a) disengage the master clutch;

(b) lower the bucket or grab to the ground.

6.2.14. Buckets and grabs of power shovels should be propped to restrict movement while they are being repaired or teeth are being changed.

6.2.15. When an excavator is at work near a wall or similar construction, persons should be prevented from entering the danger zone in which they may be crushed when the machine turns.

6.2.16. Trucks should not be loaded in any place where there may be danger from materials such as rocks falling from buckets passing overhead; where this cannot be avoided, no person should remain in the cab during loading.

(Photo: Richard Neale. Permission given by the operator and www.carillionplc.com)

6.2.17. Trucks should be stationed at such a distance from the excavator that there is a clearance of at least 60cm between the truck and the superstructure of the excavator even when it turns.

6.2.11. The boom of excavators should be prevented from accidentally swinging during operation or transport.

6.2.12. The bucket or grab of an excavator should be prevented from accidentally dipping, tipping or swinging in operation.

Do's and Don'ts – Excavators

***Do** – When excavating trenches, place the excavated material at least 600mm 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.*
***Do** - 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.*

[Taken from Safety in Construction No. 25. ROAD WORKS SAFETY GUIDE Department of Labour, Wellington New Zealand: http://www.osh.govt.nz/order/catalogue/archive/roadworksafety.pdf. **Construction OS&H** has used a number of extracts from this very good Guide, for which the ILO is very grateful. The Department of Labour web site states (on 27 04 2010) "download pdf copies free" and goes on to give advice on how to download them and use them, so ILO has presumed that this documents is in the public domain for copyright purposes.]

5 EARTHMOVING AND COMPACTING PLANT

Bulldozers

(Photo: Robert Carr, http://myconstructionphotos.smugmug.com)

6.3.1. Before leaving a bulldozer the operator should:

(a) apply the brakes;

(b) lower the blade and ripper;

(c) put the shift lever in neutral.

6.3.2. At the close of work bulldozers should be left on level ground.

6.3.3. When a bulldozer is moving uphill the blade should be kept low.

6.3.4. Bulldozer blades should not be used as brakes except in an emergency.

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.*

[Taken from Safety in Construction No. 25. ROAD WORKS SAFETY GUIDE Department of Labour, Wellington New Zealand: http://www.osh.govt.nz/order/catalogue/archive/roadworksafety.pdf. **Construction OS&H** has used a number of extracts from this very good Guide, for which the ILO is very grateful. The Department of Labour web site states (on 27 04 2010) "download pdf copies free" and goes on to give advice on how to download them and use them, so ILO has presumed that this documents is in the public domain for copyright purposes.]

Scrapers & graders

(Photo: Robert Carr, http://myconstructionphotos.smugmug.com)

6.4.2. Scraper bowls should be propped while blades are being replaced.

6.4.3. Scrapers moving downhill should be left in gear.

Dos 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.*
***Do** - 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.*
***Do** – 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!*

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.*

[Taken from Safety in Construction No. 25. ROAD WORKS SAFETY GUIDE Department of Labour, Wellington New Zealand: http://www.osh.govt.nz/order/catalogue/archive/roadworksafety.pdf. **Construction OS&H** has used a number of extracts from this very good Guide, for which the ILO is very grateful. The Department of Labour web site states (on 27 04 2010) "download pdf copies free" and goes on to give advice on how to download them and use them, so ILO has presumed that this documents is in the public domain for copyright purposes.]

6 ROAD-MAKING PLANT

Mobile asphalt layers and finishers

6.5.6. When asphalt plants are working on public roads, an adequate traffic control system should be established and reflective jackets provided for the workers.

6.5.7. A sufficient number of fire extinguishers should be kept in readiness on the worksite, including at least two on the spreader.

6.5.8. Material should only be loaded on to the elevator after the drying drum has warmed up.

6.5.9. No naked flame should be used for ascertaining the level of asphalt in the tank.

6.5.10. Thinners (cut-backs) should not be heated over an open flame.

6.5.11. If a burner flame is extinguished:

(a) the fuel supply should be cut off;

(b) the heating tube should be thoroughly blown out by the fan so as to prevent a backfire.

6.5.12. Inspection openings should not be opened while there is any pressure in the boiler.

Pavers are very complex items of machinery and require great skill to operate safely. All those involved must be properly and thoroughly trained.

(Photo: Richard Neale. Permission given by the operator)

Spreading asphalt by hand causes another set of hazards: heat, chemical contamination etc.

(Photo: Fiona Murie, BWI)

Road rollers

(Photo: Fiona Murie, BWI)

6.7.1. Before a road roller is used the ground should be examined for bearing capacity and general safety, especially at the edges of slopes such as embankments.

6.7.2. Rollers should not move downhill with the engine out of gear.

6.7.3. When a roller is not in use:

(a) the brakes should be applied;

(b) the engine should be put into bottom gear if the roller is facing uphill;

(c) the engine should be put into reverse if the roller is facing downhill;

(d) the contact should be switched off;

(e) the wheels should be blocked.

(Photo: Richard Neale. Permission given by the operators)

Dos 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.

[Taken from Safety in Construction No. 25. ROAD WORKS SAFETY GUIDE Department of Labour, Wellington New Zealand: http://www.osh.govt.nz/order/catalogue/archive/roadworksafety.pdf. **Construction OS&H** has used a number of extracts from this very good Guide, for which the ILO is very grateful. The Department of Labour web site states (on 27 04 2010) "download pdf copies free" and goes on to give advice on how to download them and use them, so ILO has presumed that this documents is in the public domain for copyright purposes.]

7 CONCRETE PRODUCTION AND MOVEMENT

7.9.4. While the drum of a concrete mixer is being cleaned, adequate precautions should be taken to protect the workers inside by locking switches open, removing fuses or otherwise cutting off the power.

7.9.6. Loaded concrete buckets should be guided into position by appropriate means.

7.9.7. Concrete buckets positioned by crane or aerial cableways should be suspended by safety hooks.

7.9.8. When concrete is being tipped from buckets, workers should keep out of range of any kick-back due to concrete sticking to the bucket.

7.9.9. Concrete bucket towers and masts with pouring gutters or conveyor belts should:

(a) be erected by competent persons;

(b) be inspected daily.

7.9.10. The winch for hoisting the bucket should be so placed that the operator can see the filling, hoisting, emptying and lowering of the bucket. Where this is not practicable, a banksman should direct the operator.

7.9.11. If the winch operator cannot see the bucket, he should, where practicable, be provided with an adequate means indicating its position.

7.9.12. Guides for the bucket should be correctly aligned and so maintained as to prevent the bucket from jamming in the tower.

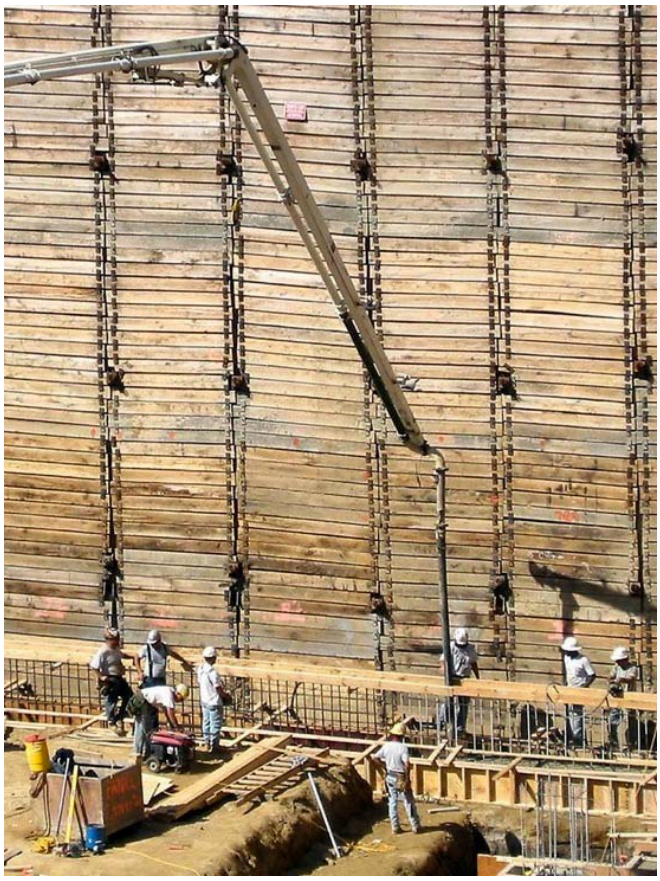
7.9.14. Pipes for carrying pumped concrete should:

(a) be securely anchored at the ends and at curves;

(b) be provided near the top with air release valves;

(c) be securely attached to the pump nozzle by a bolted collar or equivalent means.

Workers must take care when handling the discharge end of a concrete pump – see image below. This is a very heavy item and concrete is being driven out of it by strong pressure, so there is a health hazard of back and other muscular strains. The pump operator has a very important part to play in placing the boom so that the worker at the discharge end does not have to exert much force to place the concrete accurately.



(Photo: Robert Carr, http://myconstructionphotos.smugmug.com.
This is a detail of a photo shown in Theme Summary 11)

8 SITE TRANSPORT

Transport may include trucks, tipper lorries, tractors and trailers and dumpers.

(Photo: Robert Carr. http://MyConstructionPhotos.smugmug.com)

The underlying cause of most site traffic accidents is the failure to plan a safe system of work and to train workers how to follow it. However, the common immediate causes are one or a combination of the following factors:

- Bad driving techniques which include reversing blind
- Carelessness or ignorance of special hazards, e.g. work near overhead power lines or excavations
- Carrying unauthorized passengers
- Poor maintenance of vehicles
- Overloading or bad loading
- Site congestion
- Poor traffic layout
- Lack of proper roadways combined with uneven ground and debris

Safety precautions

Drivers must be properly trained and to take a vehicle on or across a public road requires a national driving licence. It is good practice for all drivers to possess a driving licence in any case. Training should include instruction on negotiating steep slopes, driving a vehicle up and down the slope, rather than across it, whenever practicable.

Routes should be levelled, marked and planned in such a way as to avoid potential hazards such as overhead power lines and steeply sloping ground. Where possible a one-way system should be used. Speed limits should be required and clearly displayed; they should be reduced for adverse site conditions and for areas near work in progress.

Vehicles travelling backwards when the driver's rear view is obscured frequently strike workers. The help of another worker is required, who must be kept in view at all times. If no one is available, the driver must walk round to the rear of the vehicle themselves to see that all is clear and give a sound signal before starting to reverse. Many vehicles now have an audible warning device such as a horn or warning hooter which sounds when reverse gear is engaged, but drivers should not rely on this alone.

An unattended vehicle should have the engine switched off, and unless the vehicle is on a marked incline the gear should be left in neutral and the handbrake on; on sloping ground the wheels should also be chocked. Tipping bodies should be lowered when the machine is unattended, but if it is occasionally necessary to leave them in the raised position they should be blocked to prevent their fall.

Foot injuries to drivers and their assistants during loading and unloading are common, so they should wear safety boots or shoes.

Maintenance

Maintenance of vehicles falls into three categories:

- A daily check by the driver of water, oil, fuel, lights, inflation of tyres and brakes – remember the acronym WOFLIB
- A weekly check by a fitter
- Periodic servicing to the manufacturers' requirements

A written record of maintenance and repairs should be kept on site.

Overturning

Construction vehicles can overturn if not used carefully so it is important not to turn at an excessive speed. Vehicles such as tractors and lift trucks should be equipped with protection to prevent the driver being hit by falling objects and from being thrown from the cab in the event of overturning.

Points to remember

- All vehicles should be kept tidy and the cab kept free from tools and materials which might obstruct the controls
- Speed limits must be enforced
- Passengers should only be carried in properly designed passenger vehicles
- Vehicles should not be driven across a slope

Loading

Loads within the capacity of the vehicle should be evenly distributed and properly secured, and should not project beyond the plan area of the vehicle. If some degree of projection is unavoidable, it should be clearly shown by the attachment of flags. Uneven loading can cause a loss of control when cornering or braking, and insecure loads may swerve or fall off the vehicle during travel. The body of a tipper lorry should always be lowered before you drive off.

Loading and unloading should be an integral part of driver training.

9 APPENDIX: TRUCK DRIVERS

The following useful advice is taken from:

Safety in Construction No. 25. ROAD WORKS SAFETY GUIDE.
Department of Labour, Wellington New Zealand
http://www.osh.govt.nz/order/catalogue/archive/roadworksafety.pdf

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.

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.

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 10km per hour of truck speed should be the minimum space between vehicles.

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.

Tips and Fills

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.

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.

[Taken from Safety in Construction No. 25. ROAD WORKS SAFETY GUIDE Department of Labour, Wellington New Zealand: http://www.osh.govt.nz/order/catalogue/archive/roadworksafety.pdf. **Construction OS&H** has used a number of extracts from this very good Guide, for which the ILO is very grateful. The Department of Labour web site states (on 27 04 2010) "download pdf copies free" and goes on to give advice on how to download them and use them, so ILO has presumed that this documents is in the public domain for copyright purposes.]

10 RELEVANT ELEMENTS OF THE KNOWLEDGE BASE

Title	ILO Code of Practice: Safety & health in construction
Type of source	Code of practice, 174 pages
Publication or other source details	ILO Publications http://www.ilo.org/global/Publications
Date & ISBN/ISSN	1992. 92-2-107104-9
Summary of contents	*"It goes a long way in mapping out the agenda for health and safety professionals in this most dangerous and populous industry."* Content: 1. General provisions 2. General duties 3. Safety of workplaces 4. Scaffolds and ladders 5. Lifting appliances and gear 6. Transport, earth-moving and materials-handling equipment 7. Plant, machinery, equipment and hand tools 8. Work at heights including roof work 9. Excavations, shafts, earthworks, underground works and tunnels 10. Cofferdams and caissons and work in compressed air 11. Structural frames, formwork and concrete work 12. Pile-driving 13. Work over water 14. Demolition 15. Electricity 16. Explosives 17. Health hazards, first aid and occupational health services 18. Personal protective equipment and protective clothing 19. Welfare
Comments on relevance	This Code of Practice is fundamental to this training package. It has influenced the structure and informed the content.
Other information	Downloaded as “ILO Code of Practice”

Title	ILO Safety, health and welfare on construction sites A training manual
Author(s)	ILO
Type of source	Training manual, 134 pages
Publication or other source details	ILO Geneva, International Labour Office Can be downloaded from: http://www.ilo.org/public/english/protection/safework/training/english/download/architecture.pdf
Date & ISBN/ISSN	1995. ISBN 92-2-109182-1
Summary of contents	Preface 1. Introduction 2. Safety organization and management 3. Site planning and layout 4. Excavations 5. Scaffolding 6. Ladders 7. Hazardous processes 8. Vehicles 9. Movement of materials 10. Working positions, tools and equipment 11. The working environment 12. Personal protective equipment (PPE) 13. Welfare facilities Annexes 1. Safety, health and welfare on construction sites: Check-list 2. The Safety and Health in Construction Convention, 1988 (No. 167), and Recommendation, 1988 (No175)
Comments on relevance	This is a comprehensive manual, which follows the contents of ILO C167 very closely. Extracts have been used in Construct OS&H, especially in the technical sections.
Other information	It has been Downloaded as ILO Safety, health and welfare on construction sites: A training manual

Title	My construction photos
Author(s)	Dr Robert I Carr
Type of source	Web site
Publication or other source details	http://myconstructionphotos.smugmug.com/
Date & ISBN/ISSN	This site was accessed for **ILO Construction OS&H** in July 2009
Summary of contents	This is the personal site of Dr Robert I Carr, one of the most highly respected professors in the construction world. He has offered more than 2000 high quality photos, fully captioned, for free use. Here he is in person: http://myconstructionphotos.smugmug.com/gallery/2435976/ Although largely taken in the USA, there are photos taken in other countries.
Comments on relevance	This is a wonderful resource for trainers.
Other information	There are some superb photos of construction hazards