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Occupational Health and Safety in Construction Industry (Continued)

Site traffic and mobile plant

Every year, workers are killed on construction sites by moving vehicles or by vehicles overturning. Many more are seriously injured in this way. The risks can be reduced if the use of vehicles and mobile plant is properly managed.

Site traffic

Plan and manage your site to minimise the number of vehicle movements

Design groundworks/landscaping to minimize the need to import fill or take spoil off site. Try to reuse spoil close to where it was excavated to reduce the distance it has to be carried.

Limit the number of vehicles on site:

- provide car and van parking for the workforce and visitors away from the work area and strictly control parking within the work area;
- use gates or barriers etc to control entry into the work area and display the procedure for obtaining entry (eg a mobile phone contact number);
- plan the location of stores/goods receiving areas carefully to reduce any need for delivery vehicles to travel through site. You may need to relocate those areas as the site progresses.

Consider ways, other than vehicles, of moving materials to where they will be used (eg self-erecting tower cranes). Such approaches can be particularly useful on sites with limited space available for access.

Plan and manage the routes on your site

Set appropriate speed limits for the routes on your site. Sign the limits clearly and consider using physical measures to restrict speeds (eg road humps).

Reversing vehicles are a major risk. Wherever possible plan your site layout to avoid the need for vehicles to reverse:

- provide drive-in/drive-out access to delivery and work areas. You may need to add extra temporary roadways to the site's permanent road system and/or delay building parts of the project to allow exit routes from dead ends;
- where roadways are narrow, or are constricted by parked vehicles or stored materials, you may need to implement a one-way system;
- design storage compounds to allow drive-through deliveries and collections;

- where drive-through routes cannot be incorporated, provide turning circles to allow vehicles to turn round without reversing, or provide a 'hammerhead' or similar turning area. You will need to fence off any turning areas to exclude all pedestrians, and they should be kept free from obstructions and parked vehicles.

If vehicles have to reverse in areas where pedestrians cannot be excluded you should ensure that:

- the driver has sufficient direct vision behind the vehicle to reverse safely; or

- the vehicle is fitted with appropriate reversing alarms, vision aids such as mirrors, CCTV etc; and/or

- a trained signaller is used to control the manoeuvre.

Plan to keep pedestrians and vehicles apart:

- provide separate entry and exit gateways for vehicles and pedestrians;

- provide firm, level, well-drained pedestrian walkways that are separated from vehicle routes and, as far as possible, take the most direct route (it is easier to make vehicles go the long way round);

- where walkways need to cross vehicle routes, provide a clearly signed, well lit crossing point.

Make sure both drivers and pedestrians can easily see each other as they approach the crossing; and

- at site exits where vehicles may have to cross the public footway, ensure that vehicles leaving site can see both ways along the footway before they need to cross it by, eg the site fence on either side of the gateway of welded mesh or other materials that do not obstruct vision, or setting the gateway back from the footway and angling the site fence to allow a wide field of view. If sufficient vision cannot be achieved, then a trained signaller should be used to control exiting vehicles.

Where vehicles and pedestrians need to share a route or working space:

- provide separate walkways alongside the vehicle route. Make sure the walkways are wide enough so that pedestrians can pass without stepping into the roadway;

- keep walkways clear of obstructions, excavations etc. If walkways have to be blocked, provide a safe diversion;

- consider separating the walkways from the roadways by at least a waist-high fence or barrier in areas of increased risk such as:

  – near loading bays, stockpiles, lorry unloading areas, storage areas and other places where reversing is likely to occur;

  – turning areas; – high traffic routes;

  - entrances and exits;
  - narrow roadways or walkways;
  - areas with restricted vision;

- in other areas it may be sufficient to use a raised kerb or marker posts to delineate the pedestrian and vehicle routes.
- take particular care at locations where pedestrians and vehicles are forced together. These locations may be permanent (such as gateways, bridges, ramps or gaps between buildings) or temporary, perhaps due to excavations or access equipment;
- make sure that drivers and pedestrians on shared routes can see each other easily; you may need to provide lighting after sunset or in bad weather. Pedestrians should wear high-visibility clothing;
- if it is necessary to undertake work on a vehicle route (eg repairing kerbs, accessing manholes or gullies etc) then treat it like work on a public road. Protect the work zone with barriers and provide advance warning signs and cones that are appropriate to the type and speed of the traffic.

Signs and instructions

Make sure that all drivers and pedestrians know and understand the routes and traffic rules on the site and provide induction training for drivers, workers and visitors.

Post plans showing the traffic routes at site entrances, site notice boards and in other places where workers can easily refer to them. Consider providing printed copies that can be marked up as necessary to guide delivery drivers. Update the notices and provide retraining if traffic routes or rules change.

Provide standard road signs to warn, guide and instruct drivers on site. In particular, make sure that routes for delivery drivers and site visitors are clearly signed.

Work areas

The risks from working plant must be controlled:

- protect any temporary structures, such as scaffolds or falsework, which might be damaged and made unsafe if struck by a vehicle;
- protect any excavations and alongside any areas of water if vehicles may approach close by;
- take precautions, such as stop blocks, where vehicles tip materials into excavations;
- make sure vehicles are not overloaded as it may obstruct the driver's view and they may become unstable, difficult to steer or the brakes may be inadequate to stop the vehicle;
- segregate the area around plant that slews (eg 360° excavators and mobile cranes). Do not

rely on the driver using mirrors, cameras etc to check that the slewing area is clear, as their attention will typically be concentrated on the machine boom or jib;

- if slewing plant is being used in a confined area where there is a risk of workers being trapped against adjacent obstructions (ie less than 0.5 m clearance), consider using a different type of machine that has zero or minimal tail swing. If alternative machines are not practicable, then secure fencing should be used to segregate the area and prevent access into the danger zone.

Many workers, including drivers, are injured when vehicles unintentionally move:

- park vehicles on level ground. Avoid parking or stopping any vehicle on a slope, handbrake malfunctions are a common contributor to run-away accidents;

- certain types of construction plant can drive up slopes that are steeper than the vehicle's normal handbrake can hold them on – check safe slopes with the vehicle supplier; and

- turn off the engine before leaving a vehicle. There have been numerous incidents where drivers have accidentally operated control levers while climbing in or out of the vehicle. Leaving the engine running also encourages unauthorized use.

Vehicles and plant

Selection

For any particular task there is often more than one item of plant or type of vehicle that could undertake it. Selecting the right plant or vehicle can make the job significantly safer.

Select the size of plant or vehicle carefully. If it is too small there can be a temptation to overload the machine and it may not have sufficient stability. If it is bigger than necessary it is likely that it will be more difficult to manoeuvre and the driver will have less visibility.

Select the type of plant carefully. In congested areas or where it is not possible to exclude pedestrians, consider using a zero tail swing 360° excavator, or a 180° excavator (backhoe loader). Tracked dumpers have better stability on slopes and on soft ground than wheeled dumpers.

Many construction vehicles have significant blind spots (areas that the driver cannot see) in various locations around the vehicle. In some cases this can create risks to both nearby pedestrians and to the vehicle when the vehicle is moving. Any load that the vehicle is carrying can create temporary blind spots.

Select vehicles with the best view around them directly from the driver's position. Often it is the more recent models that have better direct vision.

Avoid fitting additional components onto a vehicle in positions that obstruct the driver's view, eg racks to carry security grilles or supplementary exhaust filters.

Some vehicles are fitted with vision aids such as mirrors or CCTV, which help drivers to see areas that they cannot view directly. If these aids are fitted make sure they are working, properly adjusted and that the driver has been instructed in their use.

If the driver has restricted direct vision to the rear, the vehicle should be fitted with a reversing

warning signal.

Driver vision, vision aids and warning signals should never be used as the only precaution. The precautions from site management, planning and layout should be fully implemented first.

If there are blind spots remaining around a machine, decide whether any further action is required. Consider:

- what blind spots remain (including any created by typical loads);
- the ways in which the machine can move and the position of any danger zones caused by those movements; and
- whether pedestrians, vulnerable structures, and anything that might cause the vehicle to overturn are effectively prevented from being in any danger zone that the driver cannot see.

If further action to control the risks is necessary, review the site layout and management arrangements for avoiding such risks. If the risk cannot be removed by site changes, consider fitting additional vision aids or using a properly trained signaller to assist the driver.

Make sure drivers are aware of the areas of limited visibility. Warn other workers as part of their induction.

Keep cab windows and any vision aids clean.

Inspection and maintenance

Construction vehicles work in harsh environments and require effective maintenance. A programme of daily visual checks, regular inspections and servicing schedules should be established according to the manufacturer's instructions and the risks associated with the use of each vehicle.

Plant hire companies should provide information with all plant and equipment they supply, to enable it to be used and maintained safely. Vehicles should have a maintenance log to help manage and record maintenance operations.

Drivers should be encouraged to report defects or problems. Reported problems should be put right quickly and if they are safety critical, the machine should be taken out of use until they are repaired.

Planned inspection and maintenance needs to follow the manufacturer's guidelines and is likely to include, where appropriate:

- braking systems, including the handbrake;
- seat belts;
- tyres, including condition and pressures;
- steering;
- windows, windscreen washers and wipers;

- mirrors, CCTV, and other vision aids;
- safety devices such as interlocks or isolation devices;
- warning signals;
- driver protection, eg roll over protective structures (ROPS) and falling object protective structures (FOPS);
- lights and indicators;
- functional checks on controls;
- correct location of guards and panels;
- fire-fighting equipment.

Training and competence

Drivers of construction vehicles

Many accidents are the result of untrained or inexperienced workers driving construction vehicles. The use of any site plant or vehicle should be restricted to competent drivers who have been authorized to operate that vehicle.

Help prevent any unauthorized use by:

- only allowing authorized drivers to hold vehicle keys. Drivers should not loan keys to other workers;
- instructing drivers to turn off a vehicle's engine and remove the key whenever they leave that vehicle;
- ensuring all vehicles are securely immobilized whenever the site is unoccupied.

Driver competence may be judged on the basis of experience, recognized training and testing of knowledge and ability. Certificates of training from recognized training schemes help demonstrate competence in operating a general class of plant or vehicle. Training certificates should be checked for validity and training records should be kept up to date.

Drivers should also be trained in the safe operation of the specific machines that they are required to drive. This may include:

- layout and operation of the controls;
- stability limits;
- limits on drivers' vision and the use of any vision aids;
- daily checks, and how to do them safely.

No-one unfit to drive through the influence of alcohol, drugs or medication should be permitted to drive any vehicle.

Consider providing a daily briefing to drivers to update them on any problems with traffic routes or areas where other activities might cause difficulties.

Signallers

Signallers used to direct vehicle movements need to be competent to undertake the task safely. They are often the person closest to a moving vehicle and therefore they can be at significant risk of being struck by that vehicle unless they and the driver work safely. No one other than trained and authorized signallers should attempt to direct vehicle movements

Wherever possible provide signallers with a protected position from which they can work in safety. Signallers should be easily distinguished on site, eg by providing them with distinctive clothing.

Drivers under the control of a signaller should be instructed that if they cannot see the signaller they should stop immediately.

A checklist for signallers' safe working practices should be prepared.

Workforce

It is likely that every worker on site will need to travel on foot. As part of the general induction, all workers should be instructed in the safe pedestrian routes on the site, and in any site rules controlling pedestrians.

It is also likely that many workers will, at some time, need to approach a working machine. They should be instructed in a safe procedure for making the driver aware of their intention to approach, and ensuring that the machine is safely at rest before they approach.

Do not let anyone ride on vehicles or mobile plant except where the vehicle has been designed to carry a passenger.

Moving goods safely

Many construction workers are killed or seriously injured during lifting operations because of accidents such as:

- cranes overturning;
- material falling from hoists; and
- slinging failures.

Many more suffer long-term injury because they regularly lift or carry items that are heavy or awkward to handle, eg:

- block layers lifting dense concrete blocks;
- pavers laying slabs; and
- labourers lifting and carrying bagged products, such as cement and aggregates.

To avoid the risk of injury it is essential that all material handling is properly planned. Where possible, avoid people having to lift materials at all. Where lifting is unavoidable provide mechanical handling aids wherever possible. Make sure that all equipment used for lifting is in good condition and is used by trained and competent workers.
Plan for material handling:

- before the job starts, decide what sort of material handling is going to take place and what equipment will be needed;
- avoid double handling – it increases risks and is inefficient;
- make sure that any equipment is delivered to the site in good time and that the
- site has been prepared for it. Materials and products should, where possible, be delivered in a form that can easily be moved around the site with minimal manual handling, eg palletised loads that can be moved by fork-lift truck;
- ensure the equipment is set up and operated only by trained and experienced workers;
- co-ordinate site activities so that those involved in lifting operations do not endanger other workers and vice versa;
- do not stand under loads being lifted;
- arrange for the equipment to be regularly inspected and thoroughly examined at relevant time periods by a competent person. Make sure reports of through examinations and records of inspections are kept.

Manual handling

Lifting and moving loads manually is one of the most common causes of injury at work. Many manual handling injuries result from repeated operations, but even one bad lift can cause a lifetime of pain and disability. Regulations require employers to **avoid** the need to carry out manual handling which creates a risk of injury. Where avoidance is not reasonably practicable, employers have to make an assessment, reduce the risk of injury as far as reasonably practicable and provide information about the weight of loads.

There is no truly ‘safe’ weight limit for manual handling operations. The degree of risk associated with lifting varies according to the nature of the load, the circumstances in which the lift takes place, how often the lifting operation is carried out and the weight of the item that is being lifted.

When manual handling is necessary, prevent injury by:

- avoiding unnecessary handling;
- before work starts, identify operations which involve either lifting heavy or awkward loads or repetitive lifting operations. It is essential to find out the weight of heavy items which may have to be manually handled. Find ways of either:
  - avoiding the operation altogether; or – using lightweight materials, eg lightweight kerbs are available, which weigh less than 10 kg; or

- using mechanical aids, such as vacuum lifters or grabs for kerbs and paving;

- positioning loads by machine and planning to reduce the height from which they have to be lifted and the distance over which they have to be carried;

- setting limits on the size of commonly used products or material, eg not requiring anyone to manually lift building blocks, kerbs or paving weighing more than 20 kg;

- ordering bagged materials in small, easily handled sizes where possible; most building products are now available in 25 kg bags. Plan difficult manual lifts carefully, particularly if the load is to be shared. Remember, hazards arise when people are not equally matched in terms of size and strength and if they have not been trained to undertake multiple person lifts;

- training workers in safe lifting techniques and sensible handling of loads.

Manual handling injuries occurring at work may need to be reported to the authorities.

To be continued in next issue.

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