Dumper
Study Notes
PL 003
 Regulations Applicable

- Health and Safety at Work Act 1974
- The Management of Health and Safety at Work Act 1992
- Provision and Use of Work Equipment Regulations 1998
- Lifting Operations and Lifting Equipment Regulations 1998
- Supply of Machinery Regulations 1992
- The Electricity at Work Regulations 1989
- The Noise at Work Regulations 1989
- The Control of Substances Hazardous to Health Regulations 1989
- Management of Health and Safety at Work Act 1992
- Provision and Use of Work Equipment Regulations 1998 (PUWER 98)
- Supply of Machinery (Safety) Regulations 1992
- Road Traffic Act (UK)

& Guidance notes

- Control of Noise Order 1984
- Electricity on Construction Sites GS 24
- Avoiding Danger from Buried Cables GS 23
- Avoidance of Danger from Overhead Cables GS 6
- Safe use of Lifting Equipment

Category of Plant

Dumper
0.5 tonne to 6 tonnes capacity
Rigid and Articulated
Tracked
Micro-Dumper
Dumpers are purpose built, highly manoeuvrable machines designed for transporting various materials on and about building and construction sites. They work well in a variety of ground conditions ranging from paved roads to rough and muddy sites.

Dumpers are a type of machine where the skip or body is in front of the driver, whereas dumptrucks have the body behind the driver. Dumpers will therefore drive forwards into position to discharge the load. Dump trucks have to reverse into position.

Dumper capacities range from about 0.5 tonnes up to 6 tonnes but the most commonly used sizes are between 1 and 3 tonnes. Most dumpers are wheeled units but there are some crawler tracked dumpers available which are especially suited to working in poor site conditions.

Also available are very small dumpers which are generally referred to as 'micro-dumpers'. Many of these are capable of being driven through a standard sized door opening and are very useful in building refurbishment work.
MODULE TWO – TYPES OF MACHINE

Types of Dumper

The main types of dumper in use are:

1. Rigid 2-wheel drive – rear wheel steer
2. Articulated – 4-wheel drive
3. Tracked
4. Micro-Dumper

Dumper Skip Design

A wide range of skips can be fitted and they are designed to be tipped to discharge material either manually (by gravity) or hydraulically. The skip design varies according to the type of material to be carried, but the two main types are the concrete skip and the general purpose skip.

Concrete rotating skip

Concrete skip

This can be either a rotating skip or a high discharge skip. The rotating skip is mounted on a turntable so that the skip can be set to discharge forward or to either side of the dumper. The skip is rounded in shape, with a narrow mouthed chute for the accurate placing of concrete.

The high discharge skip pivots from a point near the top of the skip and enables concrete to be placed over shuttering, into pile caps or loaded into free-standing crane skips.
Both designs of concrete skip are not really suitable for general haulage of materials such as brick rubble, heavy clay etc. due to the narrow mouth of the skip.
General purpose skip

This skip is usually square in shape with a broad discharge chute. It is more suitable for brick rubble and general building materials which are not free flowing.
MODULE FOUR – TRANSMISSION SYSTEMS

Dumpers can be 2- or 4-wheel drive.

**Direct Drive**

Power from the engine is transmitted by a friction clutch through a sliding gear or constant mesh gearbox. From the gearbox the power is transferred by a propeller shaft to the crown wheel and differential and through drive shafts direct to the road wheels.

**Hydraulics**

Most modern dumpers have hydraulically operated skips, although some smaller models may still have a gravity tip system.

The skip is operated by a single control lever mounted in front or at the side of the operator.

**Steering**

**Rear-wheel steer**

Two-wheel drive dumpers have the driving wheels at the front while the rear wheels are used to steer the machine. Care must be taken when the dumper is steered. The rear end of the machine will swing out the opposite way to which the steering wheel is turned.

**Articulated steer**

The dumper is literally built in two halves which are joined together by a central pivot pin. A hydraulic cylinder alongside the pivot, and connected at each end to the two halves of the dumper, causes the machine to turn around the pivot pin when the steering wheel is operated and the hydraulic cylinder actuated.
Brakes

Dumpers are fitted with foot operated wheel brakes and a parking brake.

The footbrakes are either drum or disc type, often enclosed in the axle. The handbrake operation can vary. It may be operated through a linkage on to the wheel brake or it may operate on to a disc on the propeller shaft.
**Electrical starting**

1. Open throttle and, if applicable, set cold start
2. Press starter button or turn key and release when engine fires
3. When engine is running smoothly throttle back to fast idle
4. Check gauge readings (if fitted)
5. If necessary, reset cold start

**Preparing to Drive**

Check that the skip is in the travel position and tipping lever is in neutral.

1. Depress clutch
2. Select appropriate gear
3. Release handbrake
4. Engage clutch, at the same time accelerating smoothly
5. Check all round as the machine moves off to ensure that it is clear to proceed
Positioning for Loading

To position a dumper to be loaded by a mechanical loader (e.g. an excavator or loading shovel) the operator should drive the dumper forwards towards the loader until it is in the correct position.

Travelling

- The speed of the dumper should be regulated to suit the site conditions and the load being carried.
- Slow down before making sharp turns.
- Engage low gear when approaching an excavation or other tipping point and also when travelling up or down steep gradients.
- Only attempt to climb steep gradients that are within the machine's capabilities, and keep the load facing uphill. Extreme caution must be exercised if side slopes have to be negotiated as this reduces stability of the machine.
- Never carry passengers, either in the skip or sitting or hanging on the side.
- Always travel with the skip locked in the forward position.
- When travelling, steer with caution. Excessive speed, camber or slope, steering lock and overhanging loads can all affect the steering and can cause accidents with the dumper. Steer carefully when close to obstacles, buildings etc. as the back of the machine will swing outwards, opposite to the way the steering wheel is turned.

Dumping the Load

Slow down on approach to the dumping point and change to a low gear. Stop the machine, apply the handbrake and place gear lever into neutral.

Operate the tipping control to tilt the skip forward. Tilt fully to dump bulky loads of material, but only partially with a concrete skip to control the flow of concrete from the skip.
After tipping the load, engage gear and reverse slowly until the skip is fully clear of the dumped material. Stop and reposition the skip into the travelling position.

**Tipping into an Excavation**

A stop block should be fixed to the ground in front of the excavation to help prevent the dumper being driven over the edge.

Stop block bolted onto mild steel plate

Width of plate to be sufficient to give good spread of load under tyres

Stop block bolted to steel plate which must be firmly secured

The dumper's weight on the plate prevents movement
MODULE SEVEN – MAINTENANCE

Maintenance Programme

All machines are expensive. If users are to obtain a profitable return on plant investment, it is essential that the machine is maintained fully and economically.

An efficient maintenance programme makes use of all available resources. These include the operator, the site mechanic, depot mechanic and various workshop facilities.

The object will be to:

- maintain maximum output from the machines
- obtain maximum working life between overhauls
- as far as possible prevent breakdowns on site

Generally, maintenance can be divided into two categories:

- planned
- preventative

An effective maintenance programme should be a combination of the two.

Planned maintenance

This is an overall plan designed to ensure that the machines are fully maintained with the minimum number of staff. Aim for an even work load on the maintenance department.

The plan should take into consideration:

- company policy
- length of time the machine will be retained
- type of machine
- type of work for which it will be used
- expected hours the machine will work by day, week, month etc.
Previous experience, and knowledge obtained from records or other sources or different machine characteristics, can assist greatly in the formulation of such a plan. Regular technical inspections are necessary to allow amendments to the plan as needs arise, also to ensure that operator maintenance is being carried out efficiently. The reports from these should indicate:

- the location of the plant
- the lubrication and cleanliness state of the machine
- the mechanical state of the machine. Show repairs that require immediate action; repairs that should be effected in the very near future; and those that can safely be carried forward to a more convenient date
- the total machine hours

Records of field servicing, adjustments and running repairs will assist in amending and updating the overall maintenance plan. The plan must be sufficiently flexible to allow for unforeseen circumstances, such as machine damaged in transit etc.

**Preventative maintenance**

This is a series of checks and inspections performed at regular intervals. They are designed to extend the working life of the machine, and prevent premature and unexpected failure of components.

The inspection will be of the whole machine to assess general wear and condition of parts, and allow ordering of any replacements. It will also allow the arrangement of machine time so that repairs or replacements can be effected with the least interruption to the work schedule.

The operator’s contribution to preventative maintenance is of prime importance. It is essential that adequate time and facilities are given. Supplies of materials (oils, greases etc.) should be always to hand, with suitable provision for storing them.

All maintenance should be carried out in accordance with the machine manufacturer’s schedule or as dictated by company policy.
MODULE EIGHT – SAFETY

Dumper Safety

Common sense plays a major part in the safe working of a machine, and all operators of machinery should be aware of dangers and hazards which could injure them or other workmen nearby, or cause damage to the machine. Drivers are responsible at all times for the safety of their vehicles and loads.

Before Use

- Always check that the dumper is serviceable and safe to use
- Carry out daily checks and maintenance.
- Check working areas for hazards and obstructions which could affect dumper operation.
- Always face machine and use the hand and footholds provided when climbing on or off. Never jump.

During Use

The steering wheel must not be used as an aid to get on or off an articulated dumper as it is possible to get trapped by the movement of the front and rear chassis.

Seal belts must be worn.

Passengers must not be carried at any time. Skip must be locked in the forward position when travelling.

The driver must not remain on the dumper while it is being loaded. Stop blocks must be used when tipping materials over the edge of a trench or any excavation.

The speed of a dumper should suit the load and site conditions. Lower gear must be engaged when approaching a trench of travelling either uphill or downhill. Never allow a dumper to freewheel at any time.

If the machine is equipped for towing, ensure the correct type of pin is used and it is locked in position. Riding on towbars or trailers is strictly forbidden. When manoeuvring in confined spaces, and when your vision is obstructed, get a responsible person to guide you.
If any defects occur during use, they must be reported immediately to your supervisor.

Dumpers must **not** be left unattended with the engine running.

### Steering

The steering of dumpers, whether rear wheel or articulated, must be carried out with caution. Excessive speed, camber or slope, lock and overhanging loads can all help to cause accidents. It must be remembered when close to an obstacle that the back of the machine will swing outwards, opposite the way the steering wheel is turned.

No one should be allowed between the front and rear chassis of an articulated dumper, where they could be trapped and crushed; the driver should **not** use the steering wheel as a handhold for the same reason.

### After Use

The dumper should be cleaned, and skip hosed out as necessary. Top up fuel tank. Park on firm, level ground. Apply handbrake. Ensure gear is in neutral. Stop engine by the correct method.

The decompression lever must **not** be used for stopping the engine.

### Main Points to Remember

- Brakes become less effective in wet and muddy conditions. Keep boots as clean as possible. Muddy boots can slip off the foot controls at vital moments.

- Be on guard for a possible build-up of fumes if the dumpers are working in enclosed places or excavations.

- Always remember that on rear-wheel-steered dumpers the rear of the dumper will swing out in the direction opposite to that in which the steering wheel is turned.