

Forward tipping dumper

Note: It is recommended that you read the Supporting Information page before you read this factsheet.

Preparation and completing work *(Preparation)*

- Forward tipping dumpers are commonly used on many construction and related sites and are responsible for transporting materials safely and efficiently. The large number of forward tipping dumpers and operators means that incorrect operation often occurs and is responsible for many accidents and incidents. Operating a fully loaded dumper can be hazardous without proper training or planning, and without taking proper care and attention.
- Correct and thorough preparation is essential to all plant, including forward tipping dumpers, to ensure that the dumper is able to work safely and efficiently. Failure to properly check the dumper before work could result in injuries because faults can affect both the performance and safety of the dumper.
- Defects noted by the operator, even if they consider them to be insignificant, must be reported, otherwise the fault could get rapidly worse during the working day. For example, if the operator notices an oil leak from underneath the dumper, they must report it immediately as they may not be sufficiently qualified or experienced to decide whether it is safe to use.
- On many dumpers, access to the engine compartment is gained by opening the top canopy on which the seat is situated. On completing the checks, the operator must ensure the canopy is properly closed and locked; otherwise the seating position is unsecure and can move when the dumper is being operated.

Working safely and with others *(Working safely)*

- Dumpers are available in many sizes and the planning of work needs to take into account the optimum size of dumper required. Using the wrong size dumper can cause problems. For example, sometimes a smaller dumper is specified in order to reduce hire costs, but can often be overloaded, which may cause an incident as overloading a dumper affects its stability.
- Where a dumper is considered too big for the work or is working in a restricted area, particularly on smaller sites, the operator may need to undertake additional manoeuvring, which is inefficient, can damage the ground and may cause the dumper to strike other machines or structures.
- Dumpers are required to transport materials over a wide variety of terrain, including soft ground, inclines and rough terrain which can present hazards for the dumper operator. Therefore the work site should be planned so that travel routes from the loading point to the tipping point minimise, as far as is reasonably practical, the need to travel on poor terrain or inclines.
- The planning of travel routes also needs to take into account other factors, such as pedestrians, who if using the same route, need to be segregated from the dumper's travel route to avoid a collision.
- Planning should also take into account changes to the ground, particularly in wet weather, as the travel routes can become slippery and firm ground can turn into soft ground.
- Where the travel route passes close to the edge of an embankment, a suitable barrier should be provided to prevent a dumper from travelling over the edge.
- Tipping loads into a trench or over an edge is a particular hazard for dumper operators, and machines have fallen into open trenches when a suitable barrier system, such as stop blocks, has not been used. Although stop blocks or an earth berm should be used when tipping over an edge, operators should not rely on the stop blocks from being able to stop the dumper, as they can only minimise the risk of the dumper going over the edge.
- Dumpers are usually loaded by another machine and therefore the dumper operator needs to work with other plant operators as well as general site operatives when travelling with and unloading materials.

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- The dumper operator needs to ensure that the skip is not overloaded by the loading machine, otherwise safety issues can occur such as the operator having restricted visibility in front of the machine.
- When the operator needs to leave the seat of the dumper, even when it is being loaded, they must ensure the parking brake is applied, the transmission is in neutral and the engine is switched off. This ensures that the machine cannot move unintentionally, as accidents have occurred where the operator has unintentionally moved a transmission or gear lever into drive, and machine movement has occurred.
- If the engine is left running near to an open trench, the exhaust fumes, which can be toxic, may enter the trench. This can be a safety hazard for anyone working, or going to work, in the trench.
- In nearly all cases, forward tipping dumpers are not equipped with a cab. When the dumper is being loaded by another machine, such as an excavator or even a conveyer, it is essential that the operator leaves the driving seat and stands in a safe place where they cannot be struck either by any part of, or from any overspill from, the loading machine.
- Tipping loads requires care on the part of dumper operators. When loads are being discharged from the skip it is important, and recommended by nearly all manufacturers, that the dumper is parked on firm, flat and level ground and that the handbrake is applied.
- If the dumper is either tilted forward or to one side, instability can occur as the centre of gravity is raised when a loaded skip is raised.
- It has been known for dumper drivers, when travelling to and approaching the tipping area, to apply the handbrake instead of the footbrakes to stop the machine. This can lead to excessive wear of the handbrake system meaning it may become ineffective when it is required to hold the dumper, for example, when on an incline.

Operating requirements *(Working tasks)*

- Dumpers sometimes tow equipment such as compressors and small bowsers. Where this is undertaken, the operator must check the operator's manual first to check the criteria for towing. They must also ensure that the correct towing pin for the towing bracket is used and that the safety pin is located correctly in the towing pin, as this prevents the towing pin from jumping out of the towing bracket. Using the wrong size pin for the bracket has meant the pin has fallen out of the bracket, which can cause the trailer to become detached.
- Nearly all dumpers are now equipped with a hydraulically (clutch-less) operated transmission and it is possible to pull away in any gear. Operators need to select the correct ratio for the type of manoeuvring or driving being undertaken, as driving using too high a gear can cause overheating and damage to the transmission, particularly when manoeuvring in tight or restricted areas.
- Some dumpers are fitted with a rotating skip where loads can be discharged side-on to the dumper. Although tipping loads with any dumper requires care, tipping side-on is more hazardous as the dumper is less stable in this position. Therefore the operator needs to ensure that the load is tipped both slowly and under control, to prevent a side overturn.

Stability issues *(Stability)*

- All dumpers come equipped, unless under exceptional circumstances, with a roll over protective structure, also known as a ROPS frame or bar. If the machine rolls over, the ROPS frame can minimise, but not eliminate, injuries to an operator, providing the seatbelt is being worn.
- In some circumstances, the ROPS frame can be lowered when the machine needs to work in areas where there is restricted headroom. However, this must be properly planned so that the work area is level and has firm ground, and so that the ROPS frame is repositioned when away from the area of restricted headroom.
- Dumpers can be unstable during operation and requires planning and care by the operator both before and during work. In principle the machine's weight, particularly to the rear, counteracts or is heavier than the load in the skip.

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- As a skip is raised to discharge a load, the balance shifts towards the front of the machine, making it less stable. This means that the operator must take care when discharging loads and needs to operate all controls smoothly and whilst on firm, level ground.
- Gradients and inclines are a particular hazard, and manufacturers issue guidance on the maximum gradient that the dumper can travel on (both up and down as well as along the slope) and on how the dumper should be travelled up and down the slope.
- In principle, a loaded dumper must drive forward up a steep slope but reverse down a steep slope. The opposite generally applies when the dumper is unladen – the machine should be reversed up the slope and driven down the slope. It is important, however, that the operator, for each type of dumper, consults the operator's manual before starting work.
- Care must be taken when travelling between the loading and tipping points – even on well-maintained haul roads - to avoid potholes and raised bumps because even small ones, particularly when travelling at speed, can cause the dumper to become unstable as well as being uncomfortable for the operator.
- A loaded dumper will generally be less stable than an unladen one because of the higher centre of gravity. This means that steering and braking actions need to be smooth, particularly when on inclines and turning sharply around tight corners.
- High tip dumpers, as the name suggests, allow material to be tipped at height, but extreme care must be taken because travelling, even slowly, with a raised skip can make the dumper unstable.
- Dumpers with a narrow track (less width between each set of wheels) have a higher centre of gravity relative to the machine's size. Travelling these types of dumpers on soft or uneven ground should be avoided as the high centre of gravity means that leaning to one side whilst travelling can cause them to tip over sideways.

SAMPLE questions

The following questions are based on the text within this factsheet and indicate how the questions and answers are structured. Based on the factsheet, there is only one correct answer. The correct answer to each question is indicated at the end of this factsheet.

Q1. What is the main effect of constantly applying the handbrake to stop the dumper before it has come to a halt?



A continual loss of material from the skip



Excessive wear of the handbrake, leading to poor performance



Overheating of the handbrake system fluid



Increased tyre wear on the front tyres

Q2. What issue might result from having too much material in the skip of the dumper?



The operator may not be able to climb on the machine



The level of hydraulic fluid will need to be increased



There may be a lack of forward visibility



The dumper would have to travel too slowly

Study checklist

This checklist aims to act as a study aid to ensure that the reader has identified and understood the relevant parts of this factsheet.

Do you know?

1. What actions to take if a defect on the machine is found.
2. Why operators should not ignore any faults that they find.
3. Why the engine canopy should be properly closed and locked before work.
4. What could be the result if the dumper is not big enough for the work.
5. What should be considered when planning the travel routes between the loading and tipping areas.
6. Why barriers/stop blocks must be used when tipping into trenches.
7. What the possible consequences are if the skip is overloaded.
8. What actions to take when leaving the seat of the dumper.
9. Why an engine should not be left running near to trenches.
10. Where the operator needs to be positioned when being loaded.
11. Why the handbrake must be applied when discharging or tipping loads.
12. What can happen if tipping loads on a slope.
13. What actions need to be taken if towing trailers with the dumper.
14. What the dangers are of tipping loads side-on with a rotating skip.
15. How the machine's centre of gravity is affected when tipping loads.
16. How travelling at speed can cause instability.
17. Why loaded dumpers are less stable than un-laden ones.
18. Why high tip or narrow track dumpers can be less stable than conventional dumpers.

Answers to sample questions: Q1: B and Q2: C