

Wheeled loading shovel

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

Preparation for work *(Preparation)*

- Wheeled loading shovels are mostly used to both extract materials from a stockpile or bank, and to load vehicles in a safe and efficient manner. As with all plant, correct and proper preparation is essential to ensure that the loading shovel will work safely and efficiently.
- Manufacturers provide guidance within the operator's manual or in other ways, such as decals on the machine that show what regular checks need to be carried out. These need to be complied with; otherwise the loading shovel could be unsafe to work. Failure to properly check the loading shovel before work could lead to injuries because faults can affect the performance and safety of the machine.
- Defects noted by a loading shovel operator, even if they consider them insignificant, must be reported immediately, otherwise the fault could get worse during the working day. An operator could incorrectly diagnose what they consider to be a minor fault, such as chafing of a hydraulic hose, when in fact it could be severe, and possibly lead to injury, as the machine's performance may significantly deteriorate or a component may fail.
- Good visibility is naturally a key area for safe operations and regular cleaning of the cab glass should be undertaken before work starts. On some loading shovels, some of the cab glass is difficult to reach, particularly the rear screen.
- Before attempting to clean any glass, the task needs to be planned and controlled so that any potential fall from height can be avoided or minimised. Control measures could include the use of proper guardrail-equipped access steps.
- This also applies when checking the machine for work, as some checks may require the operator to climb onto parts of the machine, such as the loader arms or wheels, and again they could slip or fall.
- Occasionally, there is a need to change a bucket or fit another attachment and quick-hitch type couplers are fitted on some loading shovels. Buckets and other attachments have been known to detach unintentionally during work, causing injury and death. Therefore it is essential that the operator, immediately after fitting the attachment, ensures both visually and physically that the latches are fully engaged and locked. The operator must exit the cab to undertake a close and thorough examination.

Working efficiently

- Wheeled loading shovels are in many cases high production machines and reducing production costs and increasing efficiency are important to extracting and loading operations. Fuel costs form a big part of the production overheads and operators can minimise fuel consumption by working the loading shovel efficiently without the need to use maximum engine speed.
- In nearly all cases, manufacturers indicate in both the operator's manual and on the machine's rev counter the optimum engine speed or range that should be maintained to ensure the engine, transmission and hydraulic systems run efficiently.
- With the reliability of modern equipment, the engine on a loading shovel should be switched off when the operator leaves the cab, even for a short break, as this can further reduce the consumption of fuel.

Reversing and visibility *(Travelling)*

- Reversing vehicles are still a significant factor in accidents, injuries and fatalities in the workplace. Guidance recommends that the most effective option and as the first course of action is to prevent the reversing of vehicles. Where this is not reasonably practicable, such as in the case of loading shovel operations, then other measures can be taken with the next step being the restriction of loading shovel operations to within a segregated, controlled area.

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- Loading shovels, by the nature of their work, can undertake a significant amount of reversing, often within tight, confined areas where the movement of other plant and people can occur. Because of the design of a loading shovel, there is limited vision from the operator's seat and additional vision aids such as mirrors and CCTV systems can provide some assistance in providing all-round vision.
- However, each vision aid can have limitations and although CCTV systems are commonly used, they can be ineffective in strong sunlight. Mirrors for reversing have traditionally had a limited field of vision but convex types are now being fitted as they provide a wider field of vision compared with conventional mirrors.
- Certain CCTV systems indicate the range of, or distance from, an object but the image can be distorted if the correct vision mode is not selected, as some systems require settings to be changed to a reversing mode when reversing is to take place. Irrespective, operators must use all aids available at all times and not rely on one single system.
- Radar systems that detect the movement of other plant, vehicles or persons are becoming more common. Most systems allow the sensitivity to be adjusted, but in confined or congested areas often operators excessively reduce the sensitivity in order to avoid false readings from objects outside the working area so they have not picked up objects or structures directly behind the machine.
- Operators need to follow the radar systems manufacturer's recommendations for adjusting radar sensitivity and again not rely on one type of visual or electronic aid.
- Fitting of oversized bucket has caused accidents, because it not only affects stability when the loading shovel is loaded, but has severely restricted the vision of the operator, causing them to strike other machines or structures.

Stability and working safely *(Stability)*

- As loading shovels can travel and work in congested areas where other vehicles and pedestrians are moving, the planning of any travel routes needs to take into account pedestrian movement. Where pedestrians need to share the same route as loading shovels, or any plant or vehicle, then a segregated walkway must be provided. Signs warning of plant movements are not a sufficient alternative, only an addition.
- Planning should also take into account changes to the ground surface, particularly in wet weather, as both the travel routes and work area can become slippery and firm ground turn into soft ground.
- High production rates means that operators may, after discharging a load into a vehicle body, reverse and turn at the same time whilst lowering the bucket. Overturns of loading shovels have occurred because the centre of gravity has exceeded safe margins due to the raised bucket and turning action.
- The loading shovel should be travelled with the front bucket in the lowered position. Driving with a raised front bucket, particularly on inclines and uneven terrain, can cause the machine's centre of gravity to be raised and if it exceeds the wheel track (the distance between each set of wheels), can cause the machine to overturn laterally (sideways). The loading of vehicles, particularly high-sided types, should only be undertaken on firm and level ground.
- If a loading shovel is within a work area near to the edge of an embankment, a suitable barrier or earth berm should be provided that is capable of minimising the risk of the machine from going over the edge. Operators should not rely on an earth berm from being able to physically stop the loader from going over the edge. The same requirement applies when a loading shovel needs to tip a load over an edge or into a trench.
- If a loading shovel is working near to an area with overhead power lines, they need to keep clear of them. Guidance issued by the energy networks utilities indicates what minimum distances must be kept from overhead power lines and the higher the voltage in the power line, the greater the distance that must be kept. This is to reduce the danger of arcing if the machine gets too close to the line.
- In order to communicate with other workers or vehicle drivers, loading shovel operators have, although stayed within the cab, leant out of the cab's side windows and inadvertently moved one of the operating levers normally situated on the right hand side. This has activated a hydraulic service, leading to unintentional machine movement.
- It is now good practice to switch off the engine when exiting the cab. This can also eliminate the possibility of an operating or transmission lever being accidentally moved causing again unintentional movement if the engine was left running.

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- Loading transporting vehicles such as tipping lorries is a skill from which if not undertaken correctly and the vehicle body is loaded unevenly, has caused vehicles to overturn onto their side when tipping their load at the destination point. When loading smaller vehicles, operators need to take into account that it is relatively easy to unintentionally overload the vehicle.
- Where vehicles are being loaded in a congested area where there is pedestrian movement, such as the drivers of vehicles being loaded, operators need to be aware of not placing too much material on the far side of the vehicle when loading. Overspill can fall onto those who are walking alongside the vehicle.
- All loading shovels are fitted with a roll over protective structure (ROPS) – either the cab itself or an additional overhead bar. If the loading shovel does roll over onto its side, the ROPS frame can minimise, but not eliminate, injuries to an operator providing the seatbelt is being worn.
- Where a loading shovel is working on and around inclines and gradients, the correct direction of travel must be determined, as recommended by the loading shovel manufacturer, before travelling up or down a gradient. In most cases, the principle is that a loaded machine drives up a slope but reverses down whilst an unladen machine reverses up a slope but drives down.
- If the operator decides to tip a load whilst the machine is facing downhill on a slope, they need to be aware that the machine is less stable, as the centre of gravity has moved towards the front of the machine.

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. Tipping a fully loaded bucket with the loading shovel facing downhill on a slope can increase the likelihood of what?



Overloading of the tyres



Instability with the rear end of the machine rearing up



The hydraulic system not being able to raise the loader arms



The brakes won't be able to hold the loader

Q2. What can happen if the body of a tipping truck or dump truck is loaded unevenly?



The vehicles tyres can be overloaded



The body of the vehicle may not be able to be raised



The vehicle could overturn when tipping its load



The material could jam or stick when discharging

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. Who determines what checks need to be carried out before use.
2. Why the operator may not be the best person to decide whether a small-looking fault is minor or major.
3. Why climbing onto parts of the machine (such as the wheels) to clean the cab glass could be hazardous.
4. What procedures the operator must undertake if fitting an attachment using a quick-hitch type coupler.
5. How fuel consumption of the machine can be reduced and why.
6. What measures can be taken to reduce accidents due to reversing.
7. What vision aids for the operator are available and what their limitations are.
8. Why operators should never totally rely on vision aids.
9. What can be the effect of fitting an oversize bucket.
10. Why the travel route of the machine needs to be planned.
11. What causes the overturning with a loading shovel.
12. The conditions that cause the centre of gravity of a loading shovel to move.
13. What safety precautions should be taken when working near to an embankment.
14. The issues of working near to overhead power lines.
15. Why switching off the engine when leaving the cab is important.
16. The causes of unevenly loading the body of a tipping vehicle.
17. Why the wearing of a seatbelt, even in machines with a cab, is important.
18. What the procedures are for travelling and tipping loads on inclines.

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