

Tracked loading shovel

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

Preparation for work *(Preparation)*

- Tracked loading shovels are used to both extract materials from a stockpile or face and usually within areas of poor ground, load vehicles in a safe and efficient manner and undertake initial site clearance operations. Like 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. Many loading shovels are equipped with a reversing alarm, which is an essential safety item, and, before starting work, both the function and effectiveness should be checked.
- Defects noted by a loading shovel operator, even if they consider them to be 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 a small leak from the transmission system, 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.
- The tension of the tracks is usually one of the areas that need regular checks for which the procedure is detailed within the operator's manual. Although most machines are equipped with track guards, loose track tension can still cause a track to be thrown from the undercarriage.
- Good visibility is naturally a key area for safe operations and regular cleaning of the cab glass and mirrors 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 so that any potential fall from height can be avoided or minimised, for example by using proper guardrail-equipped access steps.
- This also applies to checking the machine for work, as some checks may mean climbing onto parts of the machine, such as the loader arms or tracks, and again a slip or fall could occur.
- Occasionally, there is a need to change and fit a different type of bucket, such as a clamshell (4 in 1) type bucket. The extra weight of the bucket should be taken into account by the operator both when fitting and when using.

Working efficiently

- Tracked loading shovels are sometimes used on high production tasks with reduced production costs and increased efficiency important to extracting and loading operations. Fuel costs form a big part of the production overheads and operators can minimise the fuel used by their machine 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 reversing of vehicles is, as the first course of action, eliminated. Where this is not reasonably

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practicable such as in the case of loading shovel operations, then other measures must be taken, with the next step being the restriction of operations to within a segregated, controlled area.

- Loading shovels, by the nature of their work, undertake a high proportion of reversing, sometimes within tight, confined areas where other plant and people can also be moving. Because of the design of a loading shovel, there can be 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, 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 the changing of the settings to the 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 operators sometimes excessively reduce the sensitivity in order to avoid false reading from objects outside of the working area, so they may not pick 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.
- Although tracked loading shovels are in general stable machines, accidents can occur when an oversized bucket is fitted, as this not only affects the loading shovel's stability when loaded, but can severely restrict 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 areas where other vehicles and pedestrians are moving, the planning of any travel routes needs to take pedestrian movement into account, and who needs to be segregated from the loading shovel's travel route.
- 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.
- Overturns of loading shovels have occurred because the centre of gravity of the machine has exceeded safe margins. This happens when the machine's vertical centre of gravity has exceeded the track base (the distance between each set of tracks) when travelling with a raised front bucket on uneven ground or slopes.
- As raising a loaded bucket can make the machine less stable, the loading of vehicles, particularly high-sided types, should only be undertaken on reasonably 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 bund should be provided that minimises the risk of machine 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 leaned out of the cab's side windows and inadvertently moved one of the operating levers. This has activated a hydraulic service, leading to unintentional machine movement.
- It is now best practice to switch off the engine of the loading shovel and to lower the bucket to the ground when exiting the cab. This can also prevent an operating or transmission lever being accidentally moved and causing unintentional movement if the engine is left running.

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- The loading of transporting vehicles such as tipping lorries is a skill from which if not undertaken correctly and the vehicle body loaded unevenly, has caused vehicles to overturn on 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 with some pedestrian movement, particularly by the drivers of the vehicles being loaded, operators need to be aware of any overspill on the far side of the vehicle when loading so that it doesn't hit those in the area.
- Overloading can occur when, in effect, the size of the loading shovel, or bucket, is too big for the tipping machine, such as a forward tipping dumper.
- All loading shovels are fitted with a roll over protective structure (ROPS) being 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.
- If a rear mounted ripper or scarifier is to be used, the ground must be clear of all hazards and a permit to work obtained before work starts. When undertaking vegetation clearing duties, the operator needs to ensure that debris such as tree branches is not caught or trapped within the loader arms or bucket linkage, otherwise damage to the machine could occur.

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 could occur if the tracked loader is put to work with a loose track?



The engine needs to work harder and use more fuel



The transmission system could be overstressed



A track could be thrown from the undercarriage



There would be excessive track plate wear

Q2. What should be ensured when using a clamshell/4 in 1 type bucket to pick and move vegetation such as fallen trees



That parts of trees etc. are not trapped between the loader arms or bucket linkage



That the clamshell part of the bucket is kept closed at all times



That the clamshell part of the bucket is kept fully open at all times



That the loader only clears vegetation whilst reversing

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 tracks) to clean the cab glass could be hazardous.
4. What the purpose is of the operator's manual.
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: C and Q2: A