

Excavator 180

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

Preparation and fitting attachments *(Preparation)*

- Although once a common machine on many sites, 180 excavators are now less frequently used but, being versatile machines, are still found on some construction sites as well as smaller, short duration and utility contracts.
- Daily and periodic checks form part of the operator's duties, for which they need to follow manufacturers' instructions. If defects are noticed by the operator, they need to report immediately and before the machine is used, and seek appropriate expertise to decide whether the machine can be put to work.
- An operator could incorrectly diagnose what they consider to be a minor fault, such as chafing of a hydraulic hose, where in fact the fault could be severe, and possibly lead to injury if the machine's performance significantly deteriorates or a component fails.
- 180 excavators use a wide variety of tools and attachments. It is now common through ease of use to use a quick hitch coupler to connect an attachment to the machine's dipper arm. However, buckets and other attachments have been known to detach unintentionally during work, causing injuries and death.
- On semi-automatic quick-hitch couplers, the locking pin needs to be inserted, and checked that it is in the correct hole, as investigations of attachments that have become detached have shown that the locking pin was missing or inserted into the wrong hole.
- On fully automatic quick-hitch couplers, it is vital that the operator ensures that full hydraulic pressure is applied to the coupler's latch immediately after fitting the attachment.
- For all types of quick-hitch couplers, the operator must exit the cab and ensure both visually and physically that all locking pins are inserted correctly and are retained and secure, or that latches are fully engaged and locked.
- If a tool has been used which requires pressurised oil for operation, care must be taken when removing the tool, particularly when disconnecting the oil feed and return lines. The pressure within the hydraulic lines must be exhausted or relieved, and the engine must be stopped before the lines are disconnected. Protective gloves should be worn as the oil and couplers could be very hot and could burn unprotected skin.
- Many 180 excavators are equipped with a multipurpose front bucket which, in some cases, comes with a set of forks. In preparing to use the forks normally means that each fork needs to be swung over the top of the bucket and this, due to their size and weight, involves manual handling. Assistance should be sought when swinging each fork into position and also when returning them to the stored position when they are no longer needed.
- One advantage of a 180 excavator is its ability to travel to and from the workplace without needing a transporter. As the machine is travelling on the public highway, it must comply with the Road Traffic Act which requires the machine to be registered, and displaying the appropriate Vehicle Excise Duty disc (tax disc). It is the operator's responsibility to ensure that the machine complies with the requirements for travelling on the road and the operator must hold the correct class on their driving licence.
- Operators need only to hold class B but they must be least 18 years of age if the machine is less than 7.5 tonnes and at least 21 years of age if the machine exceeds 7.5 tonnes.
- Being slow moving vehicles, 180 excavators must be fitted with a flashing amber beacon that is switched on when the machine travels on unrestricted dual carriageways. The operator needs to ensure that the beacon is visible from the rear of the machine, as it can be obscured by a folded backhoe.

Working efficiently

- 180 excavators are used by a wide number of plant hire companies as well as by owner-drivers, and fuel costs now form a major part of any production overheads. The operator can minimise the fuel used by working the machine 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.
- Due to the reliability of modern machines, the engine on the excavator should be switched off when the operator leaves the cab, even for a short break, as this can further reduce fuel consumption.

Lifting and using attachments *(Working tasks)*

- 180 excavators are commonly used to lift suspended or slung loads for which certain precautions need to be taken. Before a load is to be lifted, the lifting operation needs to be properly planned, and the operator or other relevant person needs to ensure that the machine is approved and equipped to lift a suspended load.
- The manufacturer's lifting capacities chart or data must be read in order to determine the maximum load that can be lifted at a particular reach and height. The reach is usually the horizontal distance from the boom's pivot pin on the carriage to the vertical centre line of the lifting hook.
- A boom lowering control device, commonly known as check valves, prevents the boom from lowering in case of hydraulic failure, such as a burst hose. A boom lowering control device need to be fitted along with an overload warning device on excavators where the maximum rated lifting capacity exceeds 1 tonne.
- All lifts have to, according to regulations, be properly planned by a trained and experienced person and should take into account all factors in order to minimise a risk of overturn or failure.
- When a lift is being planned, the weight of the lifting accessory (gear), such as the lifting chains, need to be added to the weight of the load. If the bucket is to remain attached to the machine, the lifting capacity of the machine needs to be reduced to take into account the weight of the bucket and any quick-hitch coupler.
- When a lifting accessory, such as a two-legged chain, is attached to the hook mounted on a quick-hitch coupler, the operator needs to tilt the coupler (by extending the bucket ram) sufficiently to ensure that the chain hangs freely and does not foul any part of the coupler.
- When working tools are used, the operator needs to be able to use each type safely and efficiently. A common tool used on 180 excavators is the hydraulic breaker and, to work this tool efficiently, operators should avoid operating it for long periods in the same place and regularly put the tip at different parts of the structure or component that is being demolished.

Working safely and with others *(Working safely)*

- It is best practice to switch off the engine and lower all equipment when the operator needs to leave the cab, even if it just to check something externally. It has been known for operators when leaving the cab to accidentally move the transmission lever, or front loader levers if they are exiting on the right, and cause unintentional machine movement.
- Another common occurrence which has resulted in accidents is where the operator has, whilst operating the backhoe, leant out of the back window to, for example, engage a boom lock or talk with co-workers, resulting in unintended movement of the backhoe and for which the trapping has occurred.
- The excavator operator should never load a dump truck or forward tipping dumper unless the driver is in a safe place. The driver can normally stay inside a protective cab of a dump truck but the operator must leave the driving seat of a forward tipping dumper and stand in a safe place so that they cannot be struck by the excavator's bucket or by any overspill from the bucket.

- If the excavator is working within a restricted or enclosed area, the operator must take into account both the potential full working radius (reach and slew) and height of the backhoe as this is the danger area for those nearby. This is very important where operations are close to pedestrians or moving vehicles, for which appropriate methods to prevent people from being in the danger area must be taken, and be sufficient enough to prevent the backhoe from exceeding area if it swings too far.
- If a signaller/banksman or any other person encroaches the backhoe's working area, the operator must immediately stop all hydraulic movements until the area is clear. Where this has not happened, workers and others have been trapped between the backhoe and a structure.
- Although all-round visibility is reasonable with most 180 excavators, blind spots do exist, particularly when the backhoe is folded and side-on to the machine, for example if the carriage is off-set to one side, which can significantly reduce visibility when reversing. Therefore extra care and vigilance is required before and during reversing.

Stability

- The stabilisers support the main proportion of the machine's weight over the rear, provide stability when lowered and allow the machine to be levelled accordingly.
- If excavating or lifting loads on soft ground whilst the backhoe is being used, the constant movement, shock loading and extra weight on one side – particularly where the carriage is offset – can cause one or both of the stabilisers to sink into the ground, and naturally affecting stability. Although operators often tend to extend the leg further, the machine should be repositioned and, if needed, additional spreader plates should be placed under the pads.
- Care must be taken when lifting either a suspended load or a full bucket load, particularly where a large-sized bucket is being used. Although the machine may appear to be stable when it is lifting in line with the chassis, if the load is slewed through 90 degrees to one side, the machine can become unstable as the counterweight effect of the machine is reduced.
- The machine can also become unstable if it is lifting a load where the machine is positioned on a slope and lifting downhill, as this increases the radius and should not be attempted.
- The machine 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 and high production rates means that operators may when loading a vehicle with the front bucket, reverse and turn at the same time whilst lowering the bucket. Overturns of 180 excavators can occur due to the raised bucket and turning action.

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. Before travelling on the road and after being fitted, what check needs to be made to the flashing amber beacon?



That the magnetic base is functional



That it is located between 1.5 metres and 2 metres from ground level



That the emergency on/off switch at the base of the beacon is functioning



That it is visible from the rear of the machine

Q2. What hazard could result from the operator leaning out of the back window of the excavator?



The front bucket could rotate forward accidentally



The engine could stall



The operating levers could be leant on, causing backhoe movement



The transmission drive could be activated

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

Do you know?

1. What procedure should be taken if a fault on the machine is found.
2. What can cause a quick-hitch attachment to become unintentionally detached from the machine.
3. Why the operator must exit the cab after fitting a quick-hitch attachment.
4. What the procedures and dangers are when disconnecting oil feed lines to a hydraulically operated attachment.
5. What the legal requirements are for machine and operator if on the public highway and travelling to the site.
6. How fuel use can be minimised and why it is important.
7. What the requirements are that have to be followed if a suspended load is to be lifted with the machine.
8. Who can plan a lifting operation, and what needs to be taken into account.
9. Which types of attachments are not considered suitable with a quick-hitch coupler.
10. What the consequences could be if the operator left the cab with the engine running.
11. Where the operator of a forward tipping dumper should be positioned when the dumper is being loaded.
12. Why the operator must take into account the working radius of the backhoe.
13. What the potential hazards are when working the excavator near to a road with moving traffic.
14. What the first course of action is if a worker or other strays into the working radius of the backhoe whilst excavating.
15. Where the operators potential blind spots are when working and driving the machine.
16. How the machine can become unstable when working the backhoe.
17. What the hazards are when slewing a loaded bucket near to full radius.
18. Why constant checks need to be made on the stabilisers when working on soft ground.

factsheet.

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