⚠ WARNING

Study This Handbook Before Starting The Machine

You must understand and follow the instructions in this handbook. You must observe all relevant laws and regulations. If you are unsure about anything, ask your JCB distributor or employer. **Do not guess**, you or others could be killed or seriously injured.

INT-1-1-1

⚠ CAUTION

Do not fit an attachment to this machine which is not JCB approved. Consult your JCB distributor before fitting any non approved attachment.

8-4-1-6

In this handbook and on the machine there are safety notices. Each notice starts with a signal word. The meanings of the signal words are given below.

⚠ DANGER

Denotes an extreme hazard exists. If proper precautions are not taken, it is highly probable that the operator (or others) could be killed or seriously injured.

INT-1-2-1

⚠ WARNING

Denotes a hazard exists. If proper precautions are not taken, the operator (or others) could be killed or seriously injured.

INT-1-2-2

⚠ CAUTION

Denotes a reminder of safety practices. Failure to follow these safety practices could result in injury to the operator (or others) and possible damage to the machine.

INT-1-2-3

MACHINE SECURITY

Vandalism and theft of unattended machines is an ever increasing problem and JCB is doing everything possible to help combat this.

JCB PLANTGUARD is a comprehensive package available to help you safeguard your machine. It includes such devices as vandal proof covers, window etching, immobiliser, concealed serial number, battery isolator, Tracker security system and much more.

Remember that the fitting of any one of these security devices will help to minimise not only the damage or loss of your machine but also subsequent lost productivity. It could also result in reduced insurance premiums.

Your JCB Distributor or Dealer will be pleased to provide information on any of these sensible precautions. ACT NOW!

INT-1-2-4

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SAFETY FIRST - YOURS AND OTHER PEOPLE'S

All construction and agricultural equipment can be hazardous. When a Skid Steer Loader is correctly operated and properly maintained, it is a safe machine to work with. But when it is carelessly operated or poorly maintained it can become a danger to you (the operator) and others.

In this handbook and on the machine you will find warning messages. Read and understand them. They tell you of potential hazards and how to avoid them. If you do not fully understand the warning messages, ask your employer or JCB distributor to explain them.

But safety is not just a matter of responding to the warnings. All the time you are working on or with the machine you must be thinking what hazards there might be and how to avoid them.

Do not work with the machine until you are sure that you can control it.

Do not start any job until you are sure that you and those around you will be safe.

If you are unsure of anything, about the machine or the job, ask someone who knows. Do not assume anything.

Remember
BE CAREFUL
BE ALERT
BE SAFE

INT-1-3-1/1

SAFETY CHECK LIST

General Safety

⚠ WARNING

Handbook

You and others can be injured if you operate or maintain the machine without first studying this handbook. Read the safety instructions before operating the machine. If you do not understand anything, ask your employer or JCB distributor to explain it. Keep this handbook clean and in good condition. Do not operate the machine without a handbook in the cab, or if there is anything on the machine you do not understand.

INT-1-3-2

⚠ CAUTION

Regulations

Obey all laws, work site and local regulations which affect you and your machine.

INT-1-3-3

⚠ WARNING

Decals

You can be injured if you do not obey the decal safety instructions. Keep decals clean. Replace unreadable or missing decals with new ones before operating the machine. Make sure replacement parts include warning decals where necessary.

INT-1-3-4

⚠ WARNING

Care and Alertness

All the time you are working with or on the machine, take care and stay alert. Always be careful. Always be alert for hazards.

INT-1-3-5

⚠ WARNING

Raised Attachments

Raised attachments can fall and injure you. Do not walk or work under raised attachments unless they are safely blocked.

INT-1-3-8

⚠ WARNING

Clothing

You can be injured if you do not wear the proper clothing. Loose clothing can get caught in the machinery. Wear protective clothing to suit the job. Examples of protective clothing are: a hard hat, safety shoes, safety glasses, a well fitting overall, ear-protectors and industrial gloves. Keep cuffs fastened. Do not wear a necktie or scarf. Keep long hair restrained.

INT-1-3-6

⚠ WARNING

Lifting Equipment

You can be injured if you use faulty lifting equipment. Make sure that lifting equipment is in good condition. Make sure that lifting tackle complies with all local regulations and is suitable for the job. Make sure that lifting equipment is strong enough for the job.

INT-1-3-7

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SAFETY CHECK LIST (continued)

Operating Safety (continued)

⚠ CAUTION

Do not attempt to operate the machine immediately after starting in cold conditions i.e. below -5°C (20°F). The machine may not respond properly to control movements. Allow at least 10 minutes warm up time with the engine at half throttle. Operate the arm and shovel services to warm the hydraulic oil.
3-1-1-5/1

⚠ WARNING

Exhaust Gases

Breathing the machine exhaust gases can harm and possibly kill you. Do not operate the machine in closed spaces without making sure there is good ventilation. If possible, fit an exhaust extension. If you begin to feel drowsy, stop the machine at once. Get out of the cab into fresh air.
INT-2-1-10

⚠ WARNING

Hazardous Atmospheres

This machine is designed for use in normal out door atmospheric conditions. It should not be used in an enclosed area without adequate ventilation. Do not use the machine in a potentially explosive atmosphere, i.e. combustible vapours, gas or dust, without first consulting your JCB Distributor.
INT-2-1-14

⚠ WARNING

Visibility

Accidents can be caused by working in poor visibility. Keep windows clean and use your lights to improve visibility. Do not operate the machine if you cannot see properly.
INT-2-1-11

⚠ WARNING

Ramps and Trailers

Water, mud, ice, grease and oil on ramps or trailers can cause serious accidents. Make sure ramps and trailers are clean before driving onto them. Use extreme caution when driving onto ramps and trailers. Always reverse up a ramp if unloaded, travel forwards if loaded. Always reverse down a ramp if loaded, travel forwards if unloaded.
3-1-1-3/1

⚠ DANGER

Sparks

Explosions and fire can be caused by sparks from the exhaust or the electrical system. Do not use the machine in closed areas where there is flammable material, vapour or dust.
INT-2-2-10

⚠ WARNING

Safe Working Loads

Overloading the machine can damage it and make it unstable. Study the lifting and/or digging specifications in this handbook before using the attachments.
INT-2-2-11/1

Maintenance Safety

⚠ WARNING

Communications

Bad communications can cause accidents. If two or more people are working on the machine, make sure each is aware of what the others are doing. Before starting the engine make sure the others are clear of the danger areas; examples of danger areas are: the rotating blades and belt on the engine, the attachments and linkages, and anywhere beneath or behind the machine. People can be killed or injured if these precautions are not taken.
INT-3-1-5

⚠ WARNING

Repairs

Do not try to do repairs or any other type of maintenance work you do not understand. Get a Service Manual from your JCB distributor, or get the work done by a specialist engineer.
INT-3-1-1

⚠ WARNING

Soft Ground

A machine can sink into soft ground. Never work under a machine on soft ground.
INT-3-2-4

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ENGINE AIR FILTER

Changing the Elements

Note: *In a dusty working environment, the outer element may have to be renewed more frequently than the service schedule recommendation. A new inner element must be fitted at least every third time the outer element is changed. As a reminder, mark the inner element with a felt tipped pen each time the outer element is changed. Do not attempt to wash or clean the elements - they must only be renewed.*

⚠ CAUTION

The outer element must be renewed immediately if the warning light on the instrument panel illuminates.
2-3-3-1

⚠ CAUTION

Do not run the engine when the outer element has been removed.
16-3-3-1

1 Stop the engine.

2 Open the engine compartment top cover.

3 Release three clips **A** and remove cover **B**.

4 Remove outer element **C**. Take care not to tap or knock the element. If necessary, remove inner element **D**.

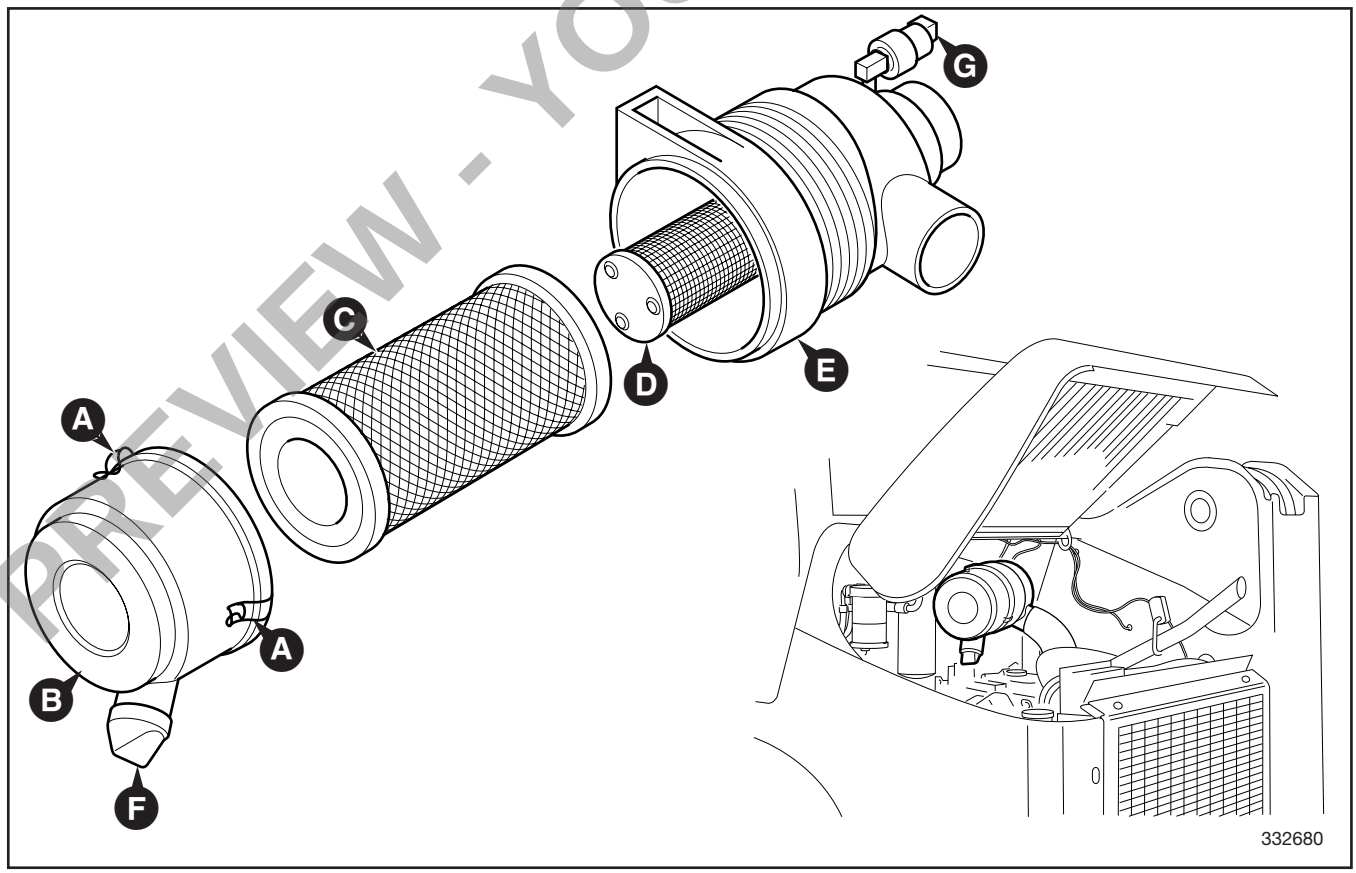
5 Clean inside the canister **E**, cover **B** and dust valve **F**.

6 Carefully insert the new elements into the canister. Ensure they are pushed fully into their spigots. Fit cover **B** with dust valve **F** at the bottom.

7 Make sure that the wire is connected to the **Air Filter Blocked** switch **G**.

8 Close and lock the engine compartment top cover.

Note: *Do not run the engine with the dust valve **F** removed.*



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STARTING THE ENGINE

Note: *Read* ***Before Starting the Engine*** *on the previous page before starting the engine.*

1 On servo machines, ensure that the Drive Control Lever **A** is in the neutral position (see Step 6 on previous page).

On manual machines, ensure that the Drive Control Levers **E** and **F** are in the neutral position (see Step 6 on previous page).

2 Switch the High-flow circuit off (if fitted). The engine will not start if the High-flow circuit is switched on.

3 Set the Hand Throttle Lever **B** to its maximum position.

4 Turn Starter Key **C** to position **H** for 6 seconds. Do not hold the key in the **H** position for more than 60 seconds.

5 Turn the Starter Key fully clockwise against the spring to position **HS** to start the engine.

Note: *The starter should be operated for no longer than 20 seconds at a time. If the engine fails to start, allow the starter to cool for a few minutes before trying again.*

6 As soon as the engine starts, release the key which will return to the **IGN** position. Slowly reduce the hand throttle setting to allow the engine to idle.

Note: *Make sure all the warning lights are* ***OFF*** *when the engine is running.*

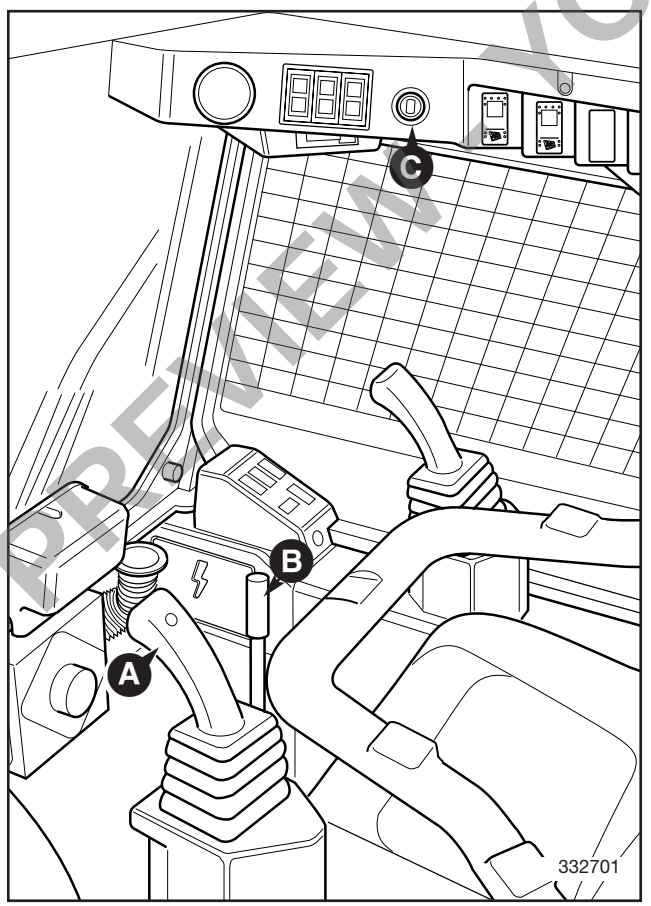
If any warning lights remain on, ***stop the engine immediately and investigate the cause****.*

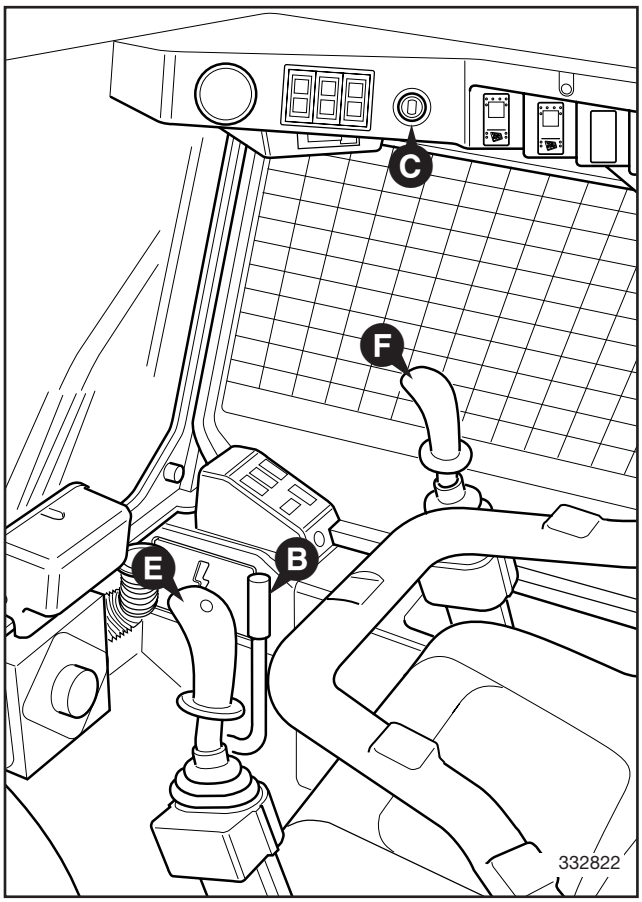
7 Once the engine has warmed up, set the Hand Throttle Lever to the required speed.

⚠ CAUTION

Do not attempt to operate the machine immediately after starting in cold conditions, i.e. -5°C (20°F). The machine may not respond properly to control movements. Allow at least 10 minutes warm up time with the engine at half throttle. Operate the arm and shovel services to warm the hydraulic oil.

3-1-1-5/1



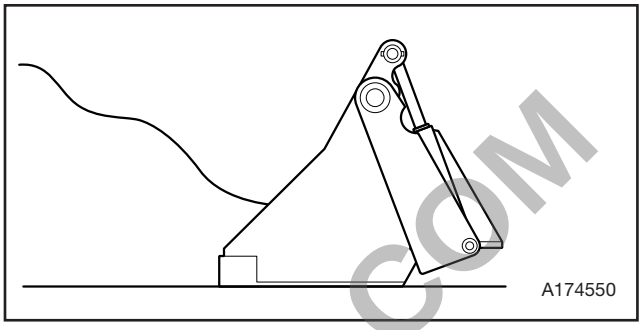


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6-IN-1 SHOVEL (continued)

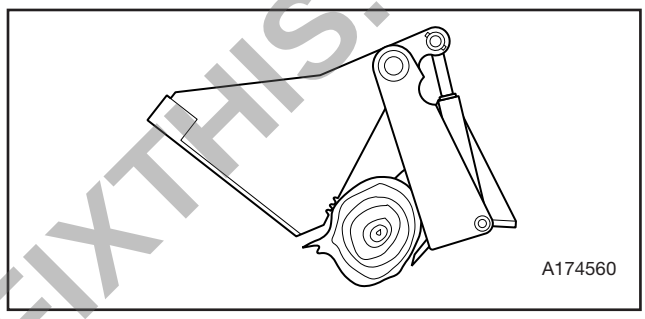
Using the 6-in-1 Shovel

Always operate the controls slowly and carefully. Drive slowly and carefully when the bucket is loaded. Keep the shovel low to the ground when moving, this increases your visibility and makes the machine more stable.



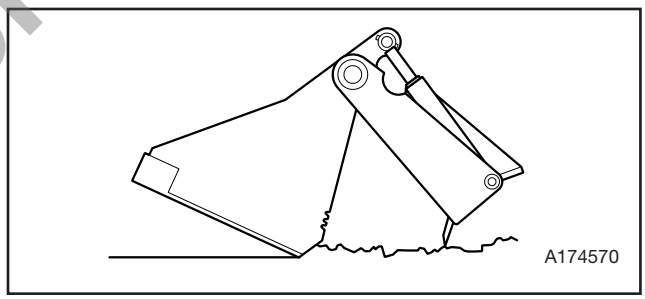
Loading and Digging

With the clam closed, the shovel can be used as a conventional shovel as described in ***Working with the Loader***. For higher dumping, open the clam instead of rolling the shovel.



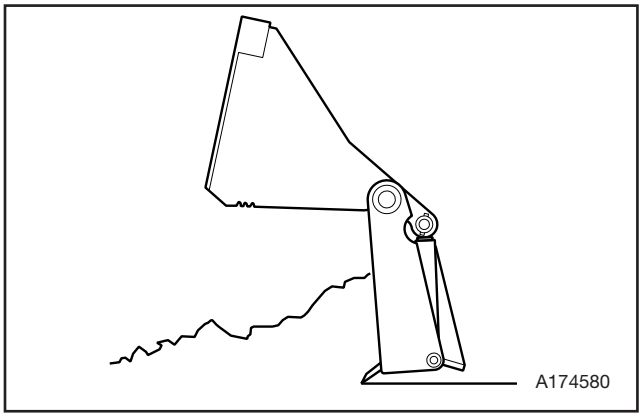
Grabbing

Open the clam and set the shovel directly above the object to be grabbed. To grab the object, lower the shovel and close the clam.



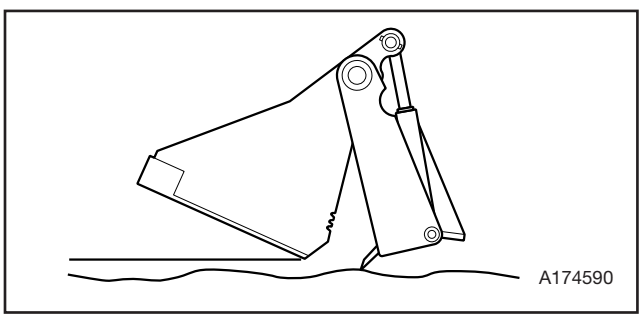
Grading

To grade, open the clam and drag the shovel backwards. When the shovel is full, roll it back and close the clam.



Dozing

To doze, open the clam and drive the machine forward.



Spreading

Load the shovel with the material to be spread. Set the clam opening to suit the size of material and rate of flow. Drag the shovel backwards, allowing it to discharge an even layer of material as it goes.

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SERVICE SCHEDULES

A badly maintained machine is a danger to the operator and the people working around him. Make sure that the regular maintenance and lubrication jobs listed in the service schedules are done to keep the machine in a safe and efficient working condition.

Apart from the daily jobs, the schedules are based on machine running hours. Keep a regular check on the hourmeter readings. Do not use a machine which is due for a service. Make sure any defects found during the regular maintenance checks are rectified immediately.

⚠ WARNING

Maintenance must be done by suitably qualified personnel. Before attempting any maintenance work, make sure the machine is safe. Park on level ground. If it is necessary to work with the loader arm raised, then the loader arm safety strut must be fitted, as shown in Loader Arm Safety Strut in MAINTENANCE section.
2-3-1-1

Every 10 Operating Hours or Daily whichever occurs first

Clean
1 Machine generally, including cab interior
2 Radiator matrix and oil cooler
3 Quickhitch locking peg housings

Check (Engine Stopped)
1 Generally for damage, including ROPS/FOPS structure
2 Engine cooling system for leaks
3 Engine coolant level and antifreeze strength
4 Fuel system for leaks and contamination
5 Hydraulic oil level
6 Hydraulic system for leaks
7 Engine oil level and condition
8 Engine generally for leaks
9 Alternator belt tension
10 Tyre pressures and condition
11 Tightness of wheel nuts
12 Windscreen washer level (if fitted)
13 Seat belt condition and security
14 Operation of horn
15 Operation of roadlights and beacon (if fitted)

Check (Engine Running)
1 Warning lights extinguished
2 Exhaust for excessive smoke
3 Operation of parking brake
4 Operation of reverse alarm (if fitted)

Grease
1 Quickhitch pivot pins

Every 50 Operating Hours or Weekly whichever occurs first

Do the Daily jobs plus:

Check (Engine Stopped)
1 Oil cooler connections
2 Radiator hoses and condition
3 Fuel filter (drain if necessary)
4 Hoses and pipework for chafing and damage

Grease
1 Loader arm pivot points
2 Lift ram pivots

Refer to next page for 100 to 2000 Hour Services

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TYRES AND WHEELS

Inflating the Tyres

⚠ WARNING

Over-inflated or overheated tyres can explode. Do not cut or weld the rims. Get a tyre/wheel specialist to do any repair work.
5-3-2-4

These instructions are for adding air to a tyre which is already inflated. If the tyre has lost all its air pressure, call in a qualified tyre mechanic. The tyre mechanic should use a tyre inflation cage and the correct equipment to do the job.

1 Prepare the Wheel

Before you add air to the tyre, make sure it is correctly fitted on the machine or installed in a tyre inflation cage.

2 Prepare the Equipment

Use only an air supply system which includes a pressure regulator. Set the regulator no higher than 1.38 bar (20 lbf/in²) above the recommended tyre pressure. (See ***Tyre Pressures*** *in SPECIFICATION section* for recommended tyres and pressures for your machine).

Use an air hose fitted with a self-locking air chuck and remote shut-off valve.

3 Add the Air

Make sure that the air hose is correctly connected to the tyre valve. Clear other people from the area. Stand behind the tread of the tyre while adding the air.

Inflate the tyre to the recommended pressure. **Do not over-inflate**.

Renewing Segments of Optional Non-Inflatable Tyres

Non-inflatable tyres are available as an option. These tyres consist of a number of individual segments bolted to the wheel rim.

Damaged segments can be renewed individually. Loosen and remove the four nuts and washers **A** (two each side of the wheel). Lift the segment clear by extracting its fixing studs from the holes in the wheel rim.

Fit a new segment in reverse order to removal, then tighten the retaining nuts to a torque of 28 Nm (21 lbf ft, 3 kgf m).

Checking the Wheel Nut Torques

On new machines, and whenever a wheel has been removed, check the wheel nut torques every two hours until they stay correct.

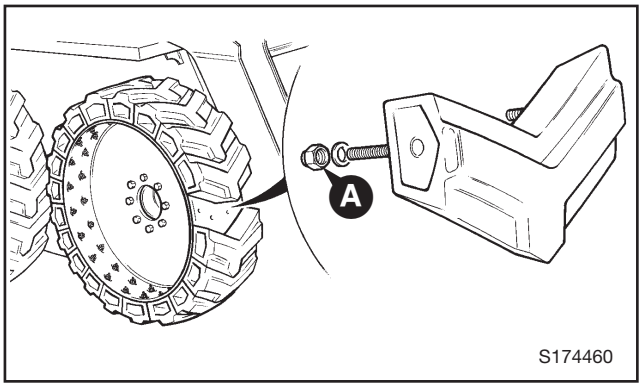
Every day, before starting work, check that the wheel nuts are tight.

The correct torques are shown in the table below.

Front and Rear Up to machine no. 680678			Front and Rear From machine no. 680679		
Nm	lbf ft	kgf m	Nm	lbf ft	kgf m
244	180	25	220	162	22.5

⚠ WARNING

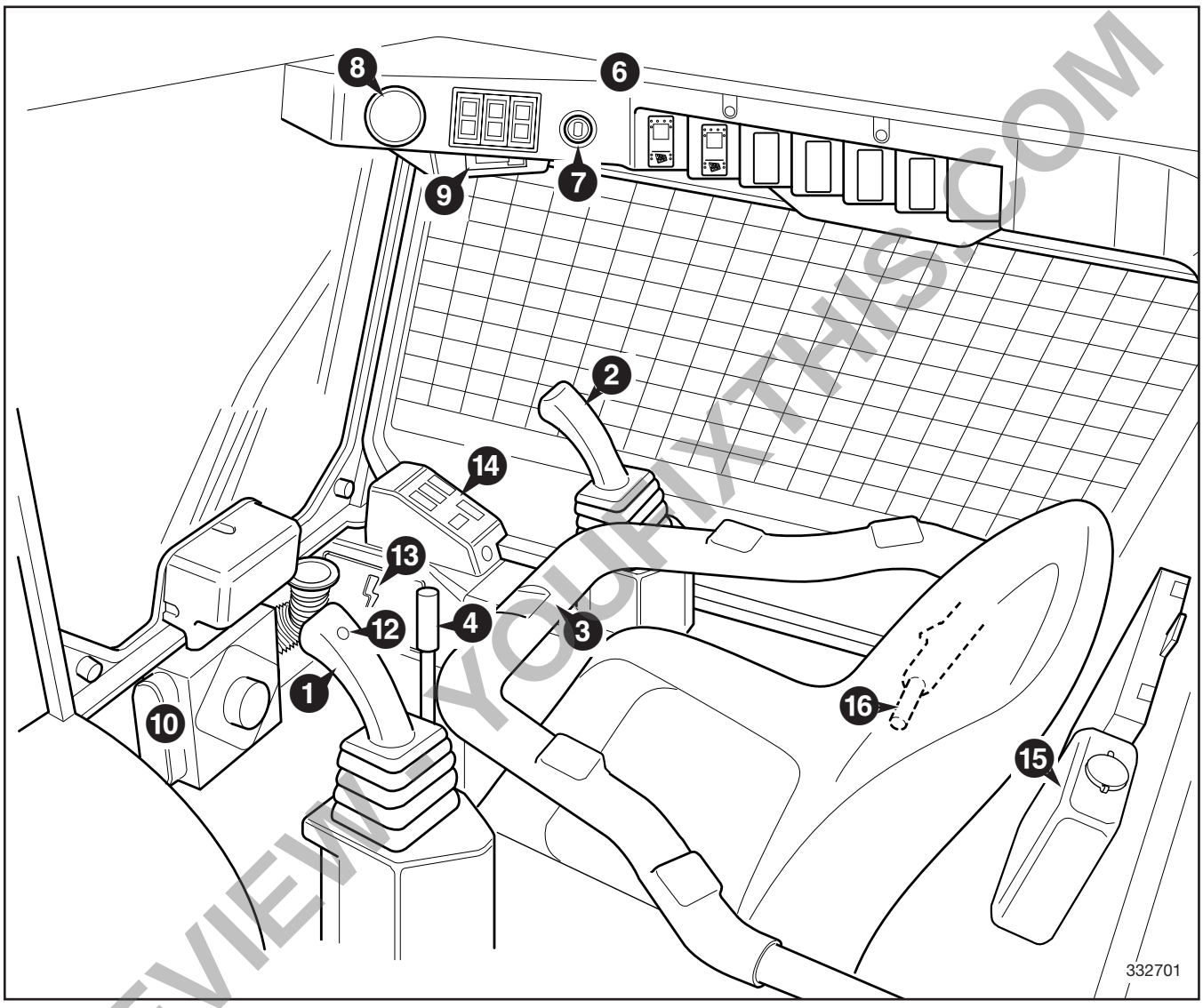
If, for whatever reason, a wheel stud is renewed, all the studs for that wheel must be changed as a set, since the remaining studs may have been damaged.
2-3-2-8

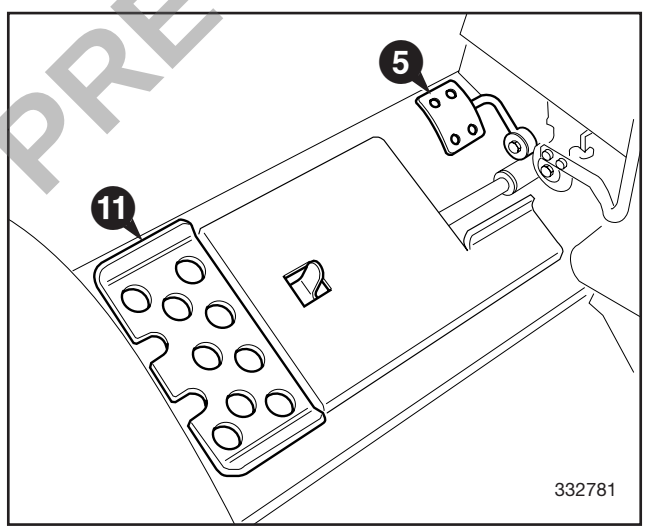


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CONTROLS, SWITCHES AND INSTRUMENTS

Cab Layout - Servo Machines





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WORKING WITH THE LOADER

⚠ WARNING

You or others can be killed or seriously injured if you operate the control levers from outside the cab. Operate the control levers only when you are correctly seated inside the cab.
INT-2-1-3

Remember that you will be driving the machine while you are using the loader. Keep alert for bystanders and possible hazards. Stay in the correct driving position. Keep your seat belt fastened and correctly adjusted.

Keep the loader arm fully down when travelling. This increases your visibility and makes the machine more stable.

Never lower the restraint bar to the working position unless you or someone suitably qualified is seated correctly in the machine and the door is properly closed and latched.

⚠ WARNING

When transporting a load on a slope, drive slowly and keep the load uphill of the machine. This will increase stability.
2-1-1-5

⚠ CAUTION

If the machine should accidentally tip forward, stop the engine as soon as possible and check the engine oil level. Some oil loss can occur if this happens.
3-2-1-10

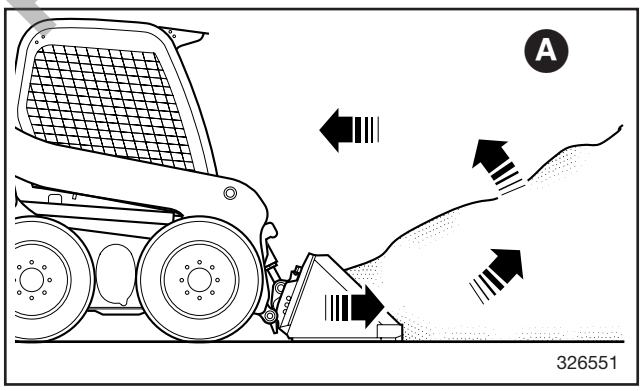
⚠ WARNING

Should the machine start to roll over, you can be crushed if you try to leave the cab. If the machine starts to roll over, DO NOT TRY TO JUMP FROM THE CAB. STAY IN THE CAB, WITH YOUR SEAT BELT FASTENED.
INT-2-1-12

Filling the Shovel

⚠ WARNING

When loading with material from a high bank or pile, remove any overhang first. Watch out for sliding material. If overhanging material falls, you and your machine could be buried.
2-2-6-3



On hard surfaces, as the shovel enters the pile, start rolling back (crowding) the shovel while raising the loading arm at the same time. This will sweep the shovel up the pile, gathering material as it goes.

Easing back the Drive Control Lever(s) will give more power to operate the shovel. Try to fill the shovel in one pass. Half full shovels are less productive.

When moving the load, roll the shovel right back to prevent spillage.

When you are loading from a pile of loose material, start at the bottom and follow up the face as shown at **A**. Approach the pile with the shovel level and the loader arm fully down.

In tightly packed material, start at the top and work down.

When removing material from a stockpile, start at a shovel's height from the base. Once the height of the stockpile has been reduced, begin loading from the base.

Loading a Truck

Put the truck(s) at an angle of about 45° to the pile, as shown at **B**. This cuts out unnecessary manoeuvring. Allow enough distance for the shovel to reach its unloading height while you are travelling, without slowing down.

Keep the wind on your back. This keeps dust away from you and your machine.

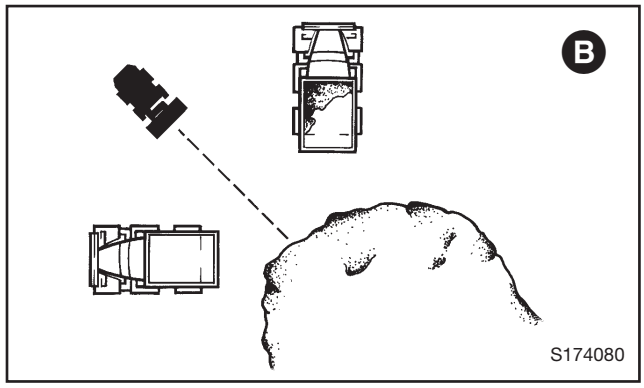
Move your machine as close as possible to the truck before unloading.

If the truck body is about as long as a shovel's width, tip the load into the centre of the truck. If the truck is two shovel-widths long or more, load the front of the truck first.

Do not dump the material in one sudden movement. Roll the shovel forward in stages until it is empty. Use the control lever to rock the shovel back and forth to loosen any sticking material.

Scraping and Cutting

If a deep cut is to be made, do it in steps of about 50 mm (2 in). With the loader arm fully down, adjust the shovel dump angle to give the desired depth of cut.



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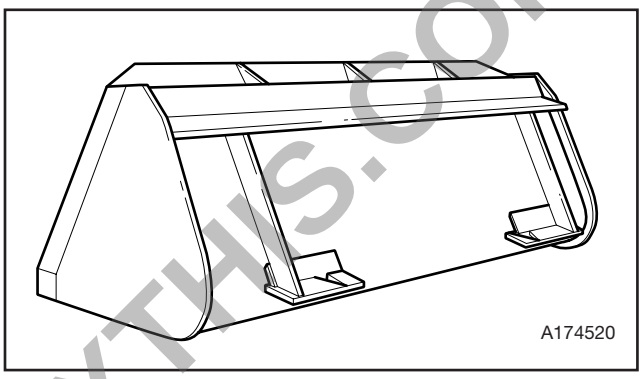
SHOVELS

The following are some of the shovels that are available for the Skid Steer Loader.

			Machine
General Purpose Shovel	0.28 m^3	(9.9 ft^3)	160
	0.34 m^3	(12.0 ft^3)	160/170
	0.36 m^3	(12.7 ft^3)	170
Construction Shovel	0.28 m^3	(9.9 ft^3)	160
	0.34 m^3	(12.0 ft^3)	160/170
	0.36 m^3	(12.7 ft^3)	170
High Performance Shovel	0.29 m^3	(10.2 ft^3)	160
	0.37 m^3	(13.0 ft^3)	160/170
Heavy Duty Low Back	0.45 m^3	(15.9 ft^3)	180
6-in-1 Shovel	0.24 m^3	(8.5 ft^3)	160
	0.27 m^3	(9.5 ft^3)	170
	0.30 m^3	(10.6 ft^3)	170

Contact your JCB Distributor for information on additional shovels for special applications.

Most attachments have an integral framework, such as the one shown below, to make them Quickhitch compatible. Others such as the Earth drill, Hammer and compactor require a separate frame, (see ***Attachment Frame***). Consult the relevant attachment literature or your JCB Distributor as to the framework required.



Typical Quickhitch Attachment Framework

6-IN-1 SHOVEL

The 6-in-1 shovel allows you to load, dig, grab, grade, doze and spread without changing attachments.

It is similar to a normal shovel except that it has an opening clam which is operated by hydraulic rams mounted on the bucket frame.

Safety

Obey all the safety instructions given in the main part of this book, plus those given in this section.

Operation

Practise using the 6-in-1 shovel off the job before working with it for the first time.

Preparing for Travel

Close the clam then treat as a standard shovel.

Control

The lift, lower, open and close movements of the 6-in-1 shovel are controlled by the loader control lever(s) (see ***Loader Controls*** *OPERATION section*).

The shovel clam is operated either by a foot pedal, see ***Auxiliary Attachments Control Pedal***, or by the right hand control lever, see ***Auxiliary Attachments Control Lever***.

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