2.0 - 3.0 Tonne (manual)

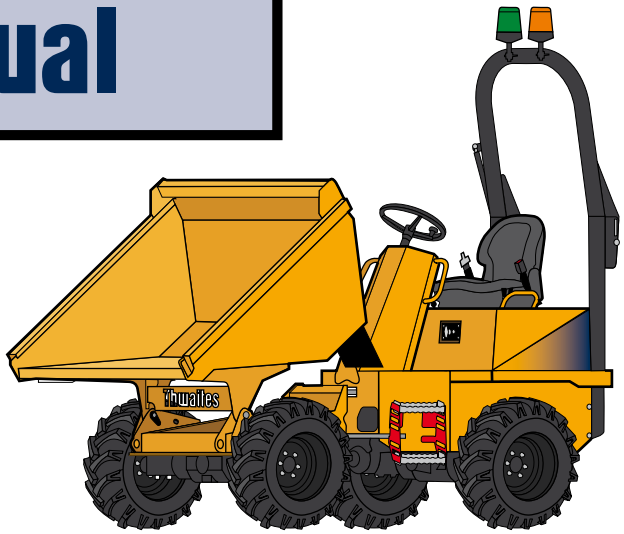
Thwaites

HSS2040 (F08A/PS)

MACH 2020, 2022,
2023, 2070, 2073.

Operator's Instruction Manual

Mach 2022 - 2 Tonne powerswivel



Mach 2020 - 2 Tonne front tip

Thwaites Limited
T0609 Issue 3

Introduction

Thwaites

Thwaites Limited puts Safety First

It is the policy of Thwaites Limited to promote safety in the operation of its machines and to create a general awareness of site safety and safe working practices for the operators of its machines.

This Operator's Instruction Manual is intended for both new and experienced machine operators. It should remain with the machine at all times. All operators should be aware of its location and contents.

It is important that all operators are fully trained and familiar with the machine and that they have read and understood the information contained within this book before they attempt to operate in the site conditions for which the machine was designed.

This book details practices and operations which Thwaites Limited recommends. DO NOT operate this machine in ways other than those detailed within this book.

This machine is designed for customary construction site operations, and the transportation of bulk materials commonly carried on such sites; that is their 'intended use'. Under certain controlled conditions the dumper may be used for towing wheeled loads.

Due to the varied nature of the operation of site dumpers and the absence of an agreed test standard, any figures quoted by Thwaites in relation to vibration values and exposure are for reference purposes only. It is the responsibility of the employer to assess vibration exposure based on the actual site conditions, and operating practices, at the point of use.

Hand Arm Vibration - The daily exposure Action/Limit Values of between 2.5 - 5.0m/s2 (A8) are unlikely to be exceeded in an eight-hour reference period.

Whole Body Vibration - The daily exposure can only be accurately determined at the point of use. This exposure must be managed in respect of the Action/Limit Values of 0.5 and 1.15 m/s2 (A8) respectively.

Employers should not rely solely on published vibration figures when undertaking risk assessments. Depending on the site conditions, cycle times may need to be adjusted in order to reduce operator exposure levels.

Vibration values based on typical duty cycles are available on request from Thwaites. These may be used for reference purposes only.

Safety Symbols

- Attention!
- Become Alert!
- Your safety is involved

- Correct action

- Incorrect action/procedure which should NOT be carried out

Signal words:

Signal words are used on the machine and within this manual to identify levels of hazard seriousness

DANGER

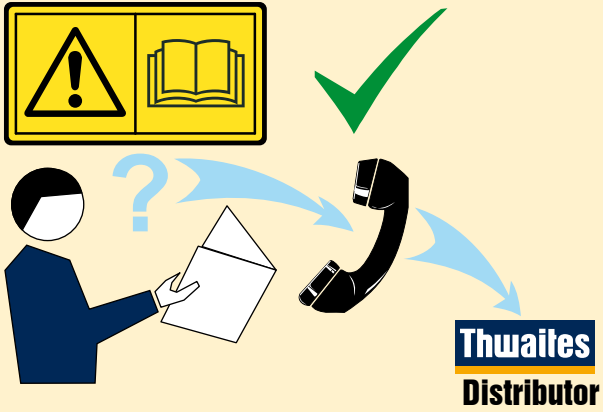
WARNING

CAUTION

1 Before operating this machine

Thwaites

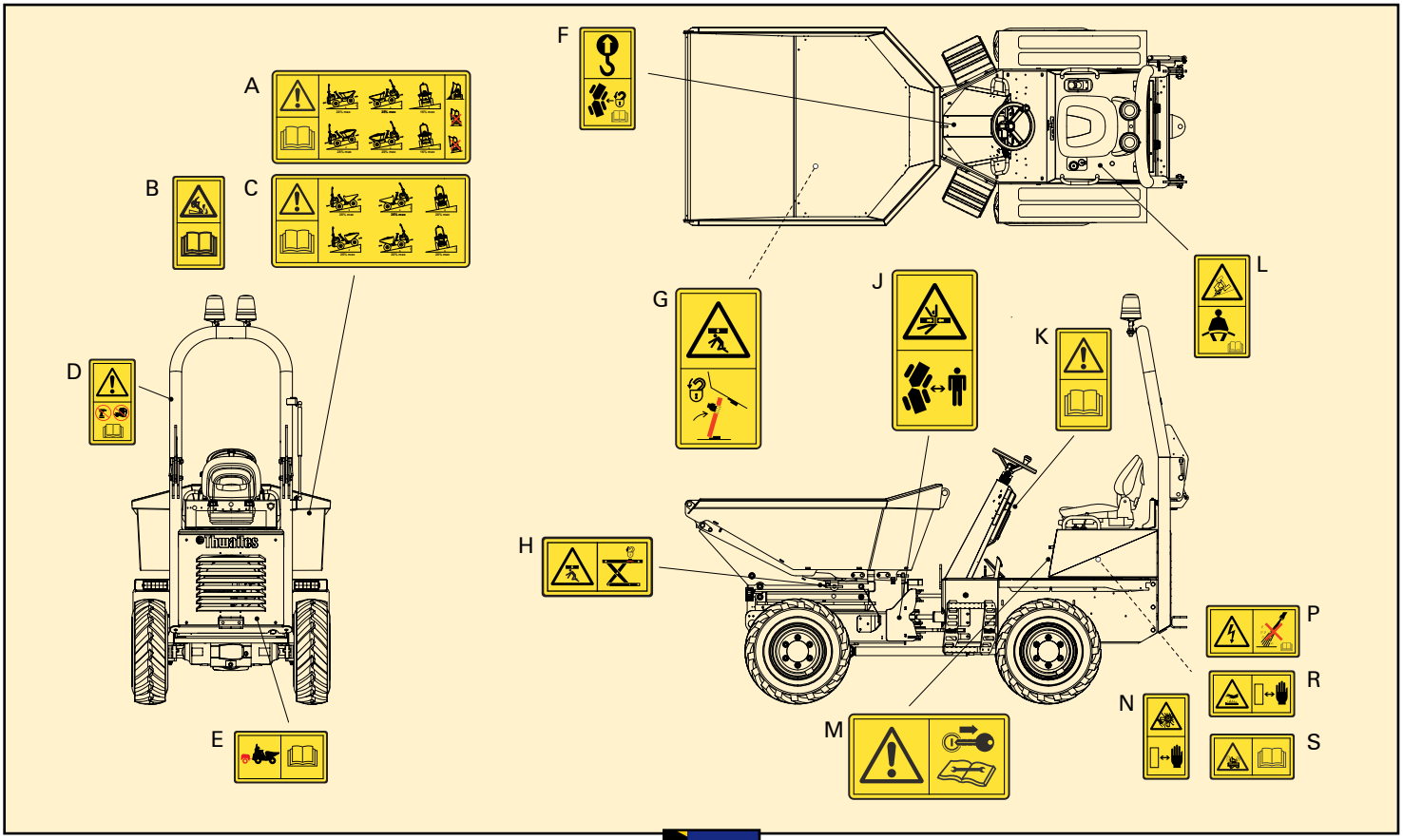
Read this operator's instruction manual



1 Contact your Thwaites dealer in case of further questions
2 Learn to operate this machine
3 Ensure you are fit to operate
4 Wear correct safety clothing and ensure safety equipment is available

Complete checks in section 1 *before starting the engine*

1 Safety label identification



Complete checks in section 1 *before starting the engine*

1 Safety label identification

Thwaites

Safety labels

The safety labels fitted to these machines are to warn the operator or bystanders of possible hazards.

- Be sure you fully understand the content and position of the labels.
- Ensure labels are clean and in good condition, do not clean labels with solvents.
- Replace lost or damaged safety labels.

☞ *There are also other labels in addition to the safety labels, handle these labels in the same way. Orientation of labels may vary from those shown.*

Item	Description	Qty
A	Gradient Front Tip - Read the operator's manual before working on gradients	1
B	Stability hazard - Do not discharge load when working on sloping ground	1
C	Gradient Powerswivel - Read the operator's manual before working on gradients	1
D	Warning roll over protective structure (ROPS) - Never modify structure	1
E	Warning - Read the operator's manual before towing a trailer	1
F	Warning lift point - Read the operator's manual before lifting the machine	1
G	Crushing of whole body - Never work under an unpropped skip	1
H	Crushing of whole body - Never work under an unlocked scissor frame (Hi swivel model)	1

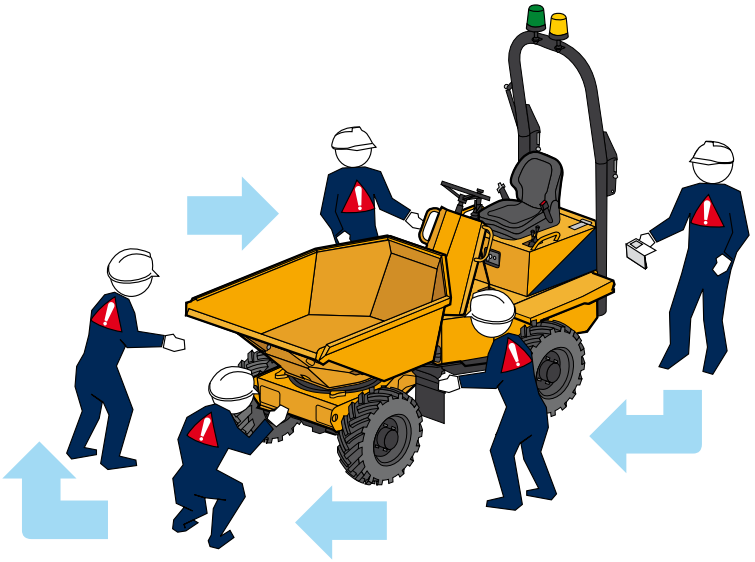
Item	Description	Qty
J	Crushing of whole body - Stay a safe distance from articulation area	2
K	Warning - Read the operator's manual before you operate the machine	1
L	Crushing hazard due to machine roll over - Always wear seat belt	1
M	Warning engine maintenance - Read the service manual before working on the machine	1
N	Warning severing of finger or hand - Keep hands a safe distance from rotating parts (under engine cover)	1
P	Electrical shock - Do not use pressure washer on electrical items (under engine cover)	1
R	Hot surface - Keep hands a safe distance from hazard (under engine cover)	1
S	Warning hot fluid under pressure - Read the operator's manual (under engine cover)	1

Complete checks in section 1 *before starting the engine*

1 Before operating this machine

Thwaites

Walk Around The Machine



Visually check the machine

1 Are the chassis lock and the skip lock disengaged?
2 Are the controls, crush zone or hydraulic rams clean, and clear of any debris?
3 Is the Roll-Over Protective frame (ROPS frame) secure, fully upright and undamaged?
4 Is the seatbelt anchorage secure and serviceable?
5 Are the covers and mudguards secure?
6 Are the hoses free from fluid leaks?
7 Are all safety decals legible?
8 Are the tyres free of cuts or splits?
9 Are all bolts tight and in position?
10 Are the steering wheel and the steering column undamaged?
11 **Have the daily maintenance tasks been performed? (See section 5)**

Report all faults immediately.

DO NOT OPERATE THE MACHINE UNTIL ALL FAULTS HAVE BEEN RECTIFIED

Complete checks in section 1 *before starting the engine*

1 Before operating this machine

Thwaites

Mount the machine and check the controls

1. Use the grabrails and foot steps provided to manoevre into seating position. Face the machine at all times when mounting and dismounting
2. Is the engine cover secure and locked?
3. Adjust the seat position for comfort and easy access to controls
4. Fasten the seatbelt. Adjust accordingly for safety and comfort
5. Is the hand brake ON?
6. Set the transmission to neutral
7. Does the foot brake feel firm?
8. Do not operate the machine without understanding all its controls as described in the following pages

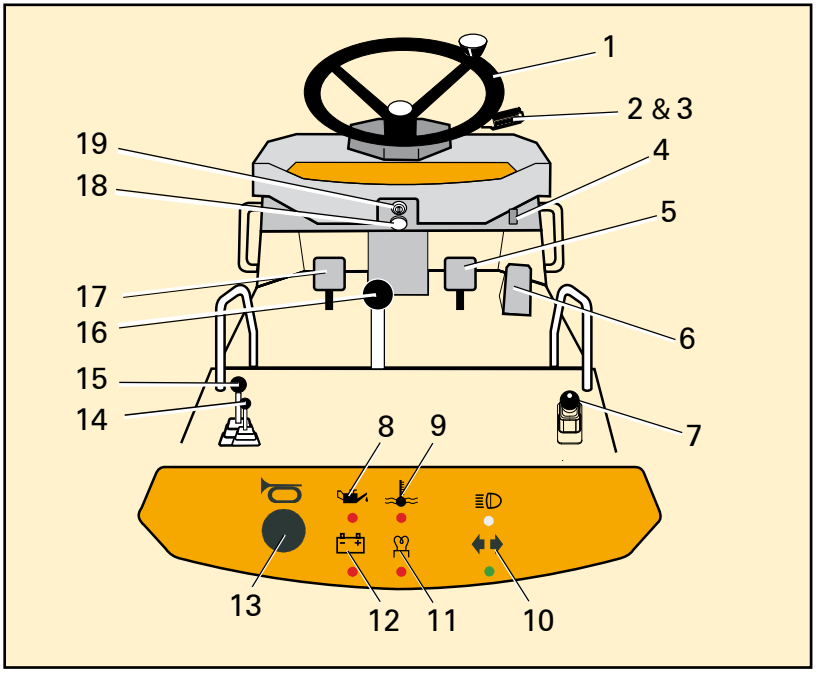
WARNING

Seatbelt MUST BE WORN when operating machines fitted with ROPS frame.

Complete checks in section 1 *before starting the engine*

1 Layout of controls

Thwaites



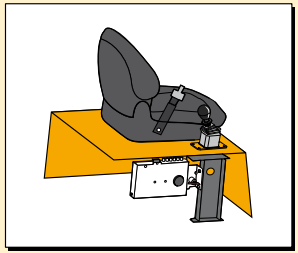
Control location & functions

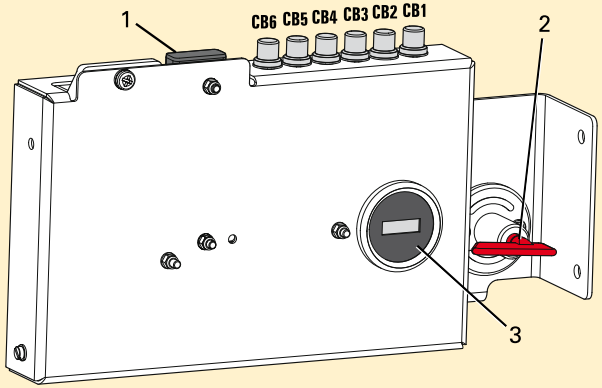
1. Steering wheel
2. Direction indicator selector - forward = left turn - back = right turn*
3. Lights - twist 1 = sidelights ON; twist 2 = headlights ON*
4. Hazard warning light switch*
5. Foot brake pedal
6. Throttle pedal
7. Hand brake lever
8. Engine oil pressure warning light
9. Water temperature warning light
10. Direction indicator pilot light*
11. Heat/start pilot light
12. Battery charging warning light
13. Horn push
14. Raise-skip lever (hi swivel model only)
15. Tip-skip lever (Fwd tip model)
    Tip-skip and rotate-skip lever (powerswivel and hi swivel models)
16. Gear lever
17. Clutch pedal (start inhibitor)
18. Ignition & hand brake warning buzzer
19. Ignition switch

* Optional items

Complete checks in section 1 *before starting the engine*

1 Layout of battery





1 Maxi fuse
2 Isolater switch
3 Hour meter
CB1 Transmission
CB2 Power
CB3 Lights* / Becon / Horn
CB4 Hazard* / Lights*
CB5 LH side lights*
CB6 RH side lights*

* Optional items

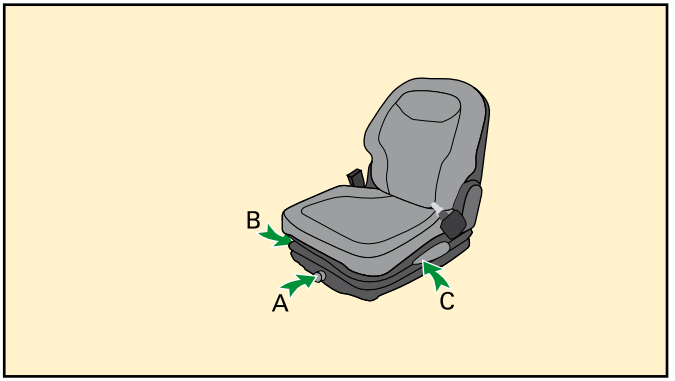
Complete checks in section 1 *before starting the engine*

1 Control functions – explained

Thwaites

Seat Adjustment

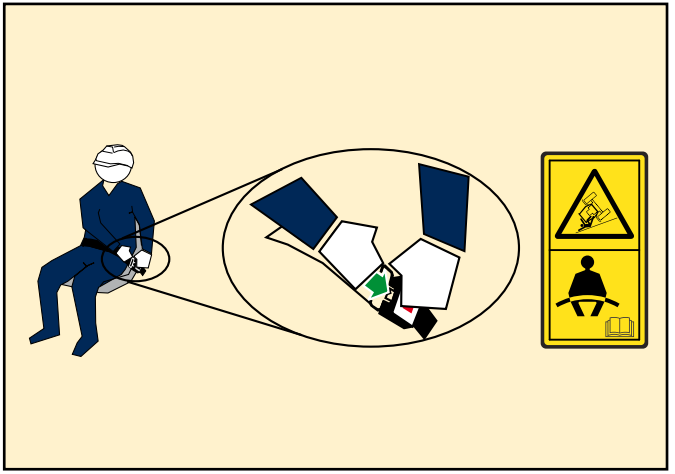
A – Turn knob to set driver weight
B – Lift to slide seat assembly forwards/backwards
C – Lift handle to adjust backrest



Seatbelt

- Adjust length of belt when seated on machine
- Press buckle blade into buckle lock
- Pull belt webbing through buckle blade to remove slack

Seatbelt should not be worn loose, it should pass comfortably across hip bones and not the abdomen



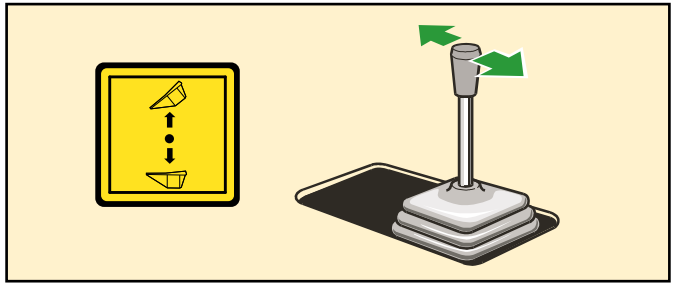
Complete checks in section 1 *before starting the engine*

1 Control functions – explained

Thwaites

Tip-skip lever (forward tip model)

- Push forward to tip skip
- Push backwards to return skip



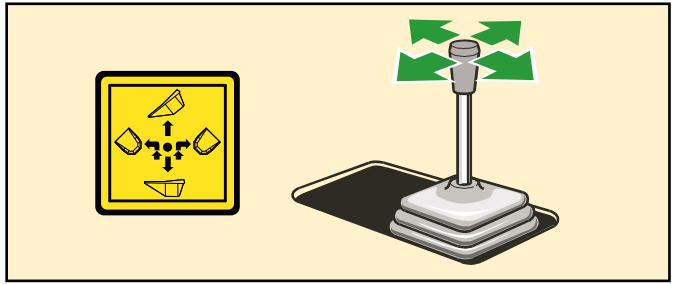
Rotate-skip lever (swivel models)

- Raise skip 100 mm (4") to disengage pivot centring lock

☞ *Rotate skip, fully lowered, to automatically engage centring lock*

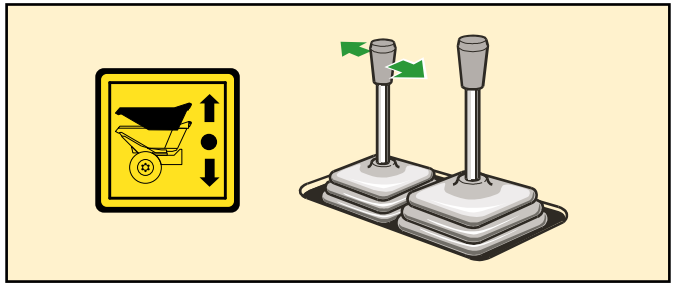
- Raise skip and push lever to the right to rotate skip to right
- Raise bucket and push lever to the left to rotate skip to left
- Push forward to tip skip
- Push backwards to return skip
- Increased engine speed reduces cycle times

☞ *Movement of the skip is disabled if the steering wheel is moved (Priority Steering)*



Raise-skip lever (Hi swivel model only)

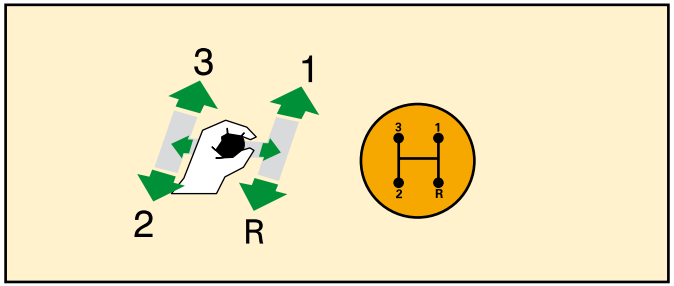
- Push forward to raise skip
- Push backwards to lower skip



Complete checks in section 1 *before starting the engine*

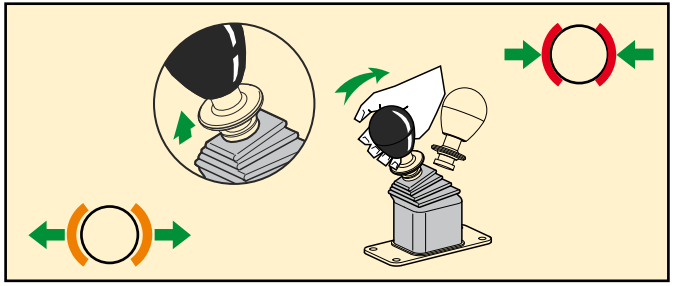
1 Control functions – explained

Thwaites



Gear lever – left hand

Forward-left Third gear		Forward-right First gear
	Neutral	
Back-left Second gear		Back-right Reverse

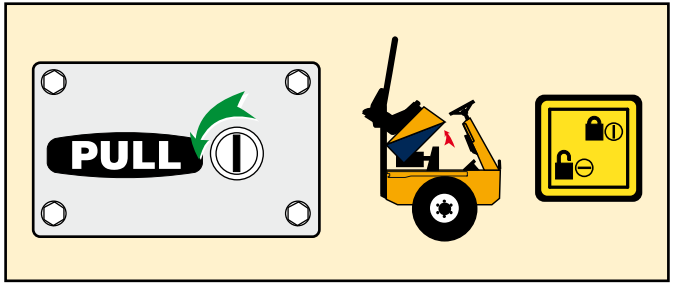


Hand brake lever - right hand

- Use only when the machine is stationary (or in an emergency)
- Pull lever back to apply, lift collar pull back and releace collar to lock.
- Lift collar and lever will move forward to release.

An audible warning device is fitted to your machine. This will sound if the parking brake is engaged whilst forward or reverse is selected and machine will not move.

Engine will not start if parking brake is not engaged.



Engine cover open/close

- Insert ignition key and turn anti-clockwise to unlock
- Pull handle to release and raise cover
- Lower cover, secure and lock before driving

Complete checks in section 1 *before starting the engine*

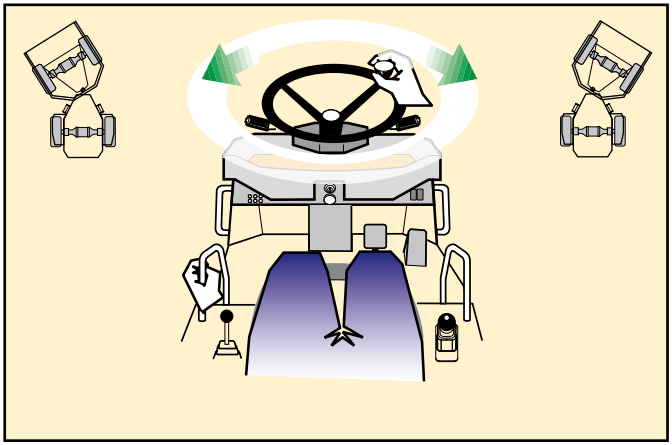
1 Control functions – explained

Thwaites

Steering wheel

- Turn the wheel clockwise to turn machine to right
- Turn the wheel anti-clockwise to turn machine to left

Ensure the non-steering hand is on the engine cover grab rail when using the spinner knob for low-speed single-handed steering.



Throttle pedal - right foot (A)

- Apply pressure to increase speed
- Reduce pressure from the pedal to reduce speed

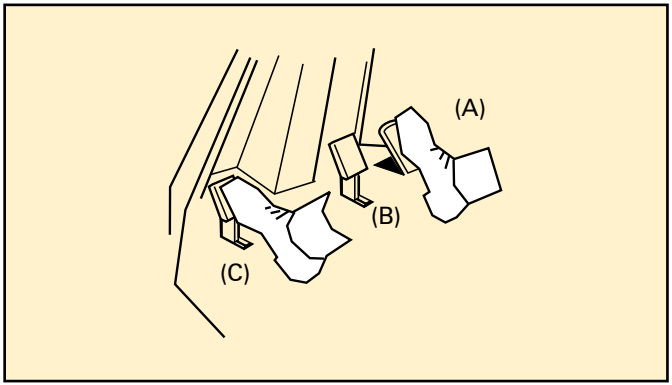
Foot brake pedal - right foot (B)

- Apply pressure down on the pedal to slow/stop the machine

Clutch pedal - left foot (C)

- Press down before each gear change - select gear and release

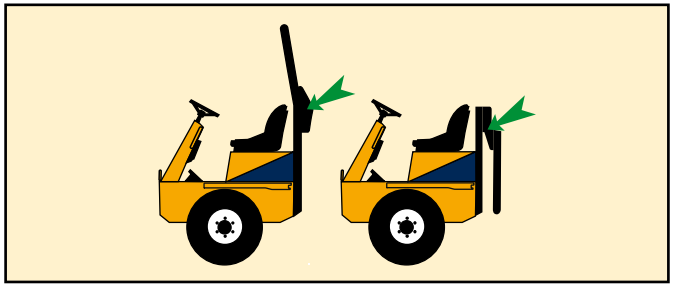
Start inhibitor fitted - press down clutch pedal before starting engine



Complete checks in section 1 before starting the engine

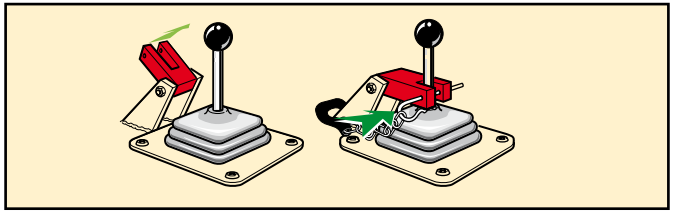
1 Control functions – explained

Thwaites



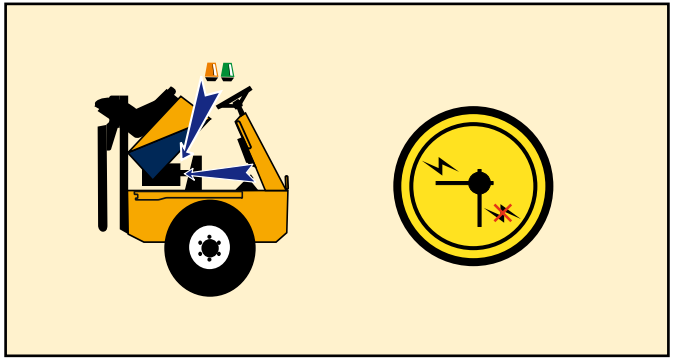
Lowering and raising the folding ROPS frame

- Remove linch pins and withdraw frame lock pins
- Lower frame and insert lock pins and linch pins in new position
- Reverse the procedure to raise the frame
- Ensure all pins are secure before driving



Tipping lever lock *(optional)*

- Place yolk over tipping lever and secure with linch pin



Beacon stowage

- Unscrew and remove beacons
- Secure beacons on brackets provided beneath bonnet

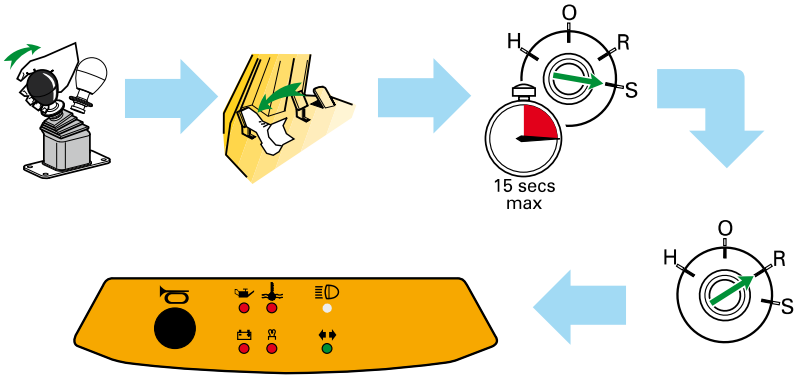
Battery isolator (beneath engine cover)

- Turn key anti-clockwise to isolate the battery power supply

Complete checks in section 1 *before starting the engine*

2 How to START and STOP the engine

Thwaites



WARNING

DO NOT START THE ENGINE UNLESS SEATED IN THE DRIVING POSITION.

CAUTION

If a panel light remains on switch off engine (key to 'O') and investigate the problem.

To start the engine

- Apply hand brake
- Depress clutch pedal
- Cold start aid (when required)-

  Turn key to position 'H'. When panel light extinguishes start engine (as above).
- Turn the key clockwise to the start position **'S'**.

  All panel lights self-test (illuminate) and should extinguish on start-up.
- Allow the engine to turn for a maximum of 15 seconds.

  If the engine does not start within 15 seconds, return key to position 'O' and wait 30 seconds before turning to 'S' again.
- When the engine fires, release key.

  (Springs back to 'Run' position 'R').

To stop the engine

- Turn key to position **'O'**.

CAUTION

- Do not use unauthorised starting aids
- Do not tow or bump start

Complete checks in section 2 *before loading the machine*

2 Preliminary checks

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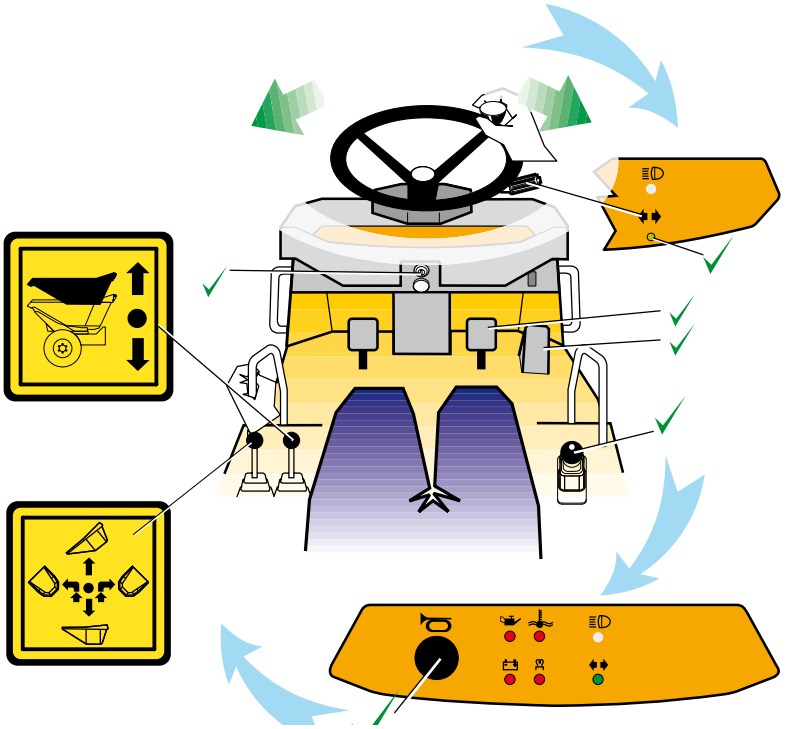


Function checks - engine ON

Brakes

- Does the foot brake pedal feel firm?
- If the hand brake is on, and a gear is selected, a buzzer will sound and the drive may be disconnected.

Steering

- Rotate steering wheel clockwise and anti-clockwise

Electrics

- Does the horn sound correctly?
- Does the reverse alarm sound correctly?
- Are the beacons flashing?
- Are the lamps working correctly? (optional) –
  - * Side lights
  - * Head lights
  - * Stop
  - * Indicators
  - * Hazards

Tip-skip lever/Rotate-skip lever

- Discharge/park skip
- Rotate - right to left/left to right. (powerswivel and Hi-Swivel models).

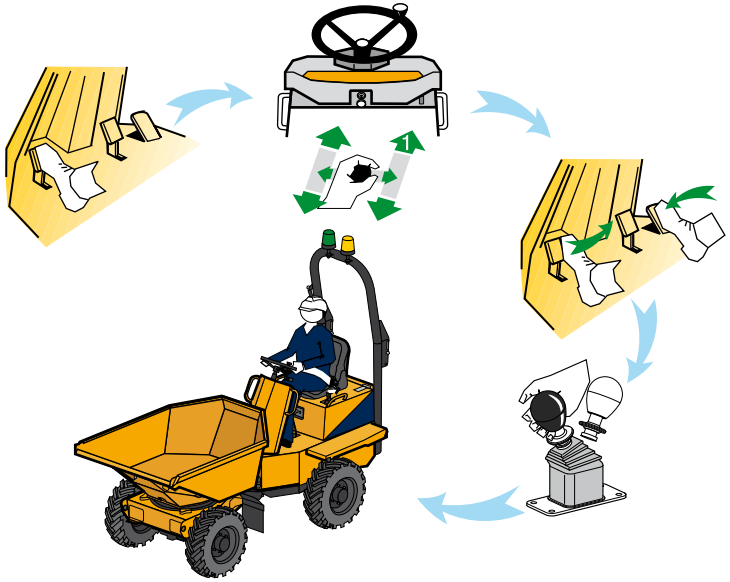
Raise-skip lever

- Raise/lower skip. (Hi-Swivel model only)

Complete checks in section 2 *before loading the machine*

2 Driving procedure and safe parking

Thwaites



CAUTION

- Novice operators should always start with forward motion on clear, level ground.
- A low gear should always be selected when a driver is unfamiliar with machine type.
- Do not mount or dismount the machine with the engine running.

Moving from rest and stopping

If green beacon option is fitted seat belt must be buckled.

- Depress clutch pedal
- Select first gear
- Slowly depress accelerator pedal, release clutch pedal and hand brake lever and move slowly
- Hold steering wheel with both hands
- Remove foot from accelerator pedal
- Brake gently to a halt, using foot brake pedal, and press clutch pedal to prevent stalling
- Apply hand brake and select neutral

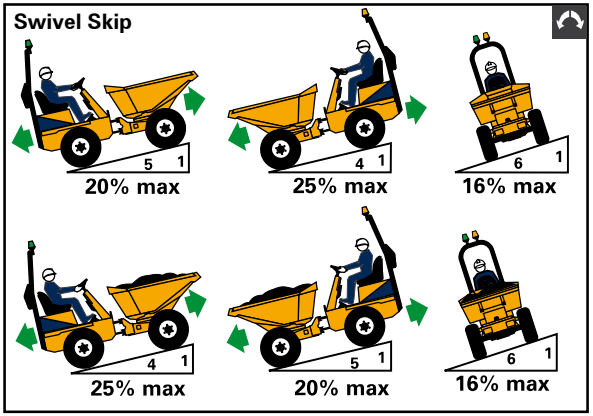
Changing speed/direction

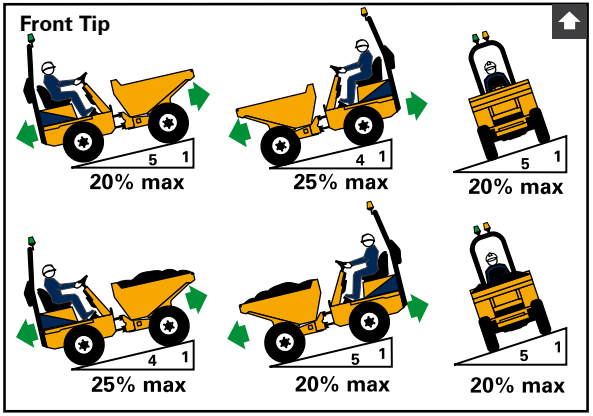
- Release accelerator pedal
- Depress clutch pedal
- Select an alternative gear
- Release clutch pedal and press accelerator pedal
- Before changing direction (forward/reverse), stop the machine and engage the hand brake

After operating – park safely

- Always leave skip empty when not in use
- Ensure machine is on firm level ground
- Apply hand brake
- Engage neutral
- Hydraulic system at rest in a safe condition
- Stop engine and remove key
- Lock engine cover

Complete checks in section 2 before loading the machine

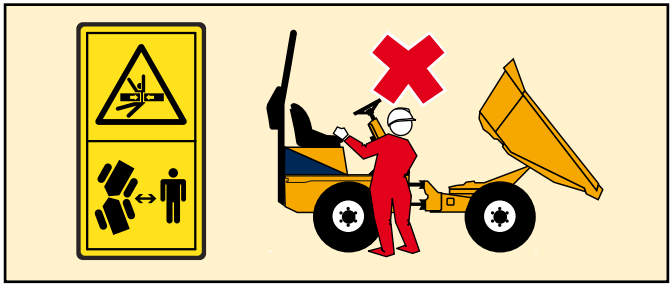


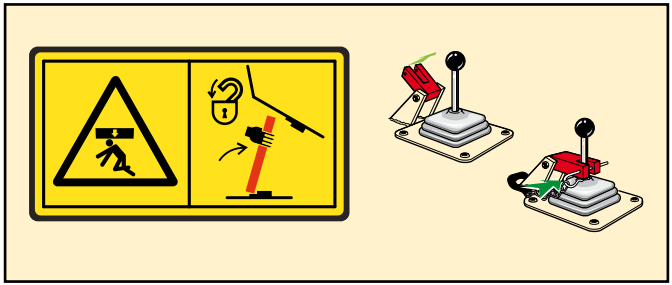


WORKING ON GRADIENTS

- DO NOT exceed maximum stated gradients
- DO NOT turn across gradients
- DO NOT brake suddenly in wet, muddy, icy conditions or when operating on loose surfaces
- DO NOT run downhill with controls in neutral
- DO NOT operate skip-raise lever (Hi swivel model) on sloping ground. **Check indicator**

- Travel straight up, down or along a gradient
- Keep speed to a minimum and use the foot brake to reduce speed when travelling down gradients
- To prevent movement, always engage hand brake when stopped on sloping ground. Chock wheels securely when leaving the machine unattended
- Always position swivel-skip in central lock





✗ **CRUSH ZONE**
Stay clear of articulation area when the engine is running

✗ Never operate machine controls when standing on either side of machine

✓ **WORKING UNDER A RAISED SKIP**
Lock skip safety prop during maintenance

✗ Never work under an unpropped skip

✓ When using skip safety prop engage tip-skip lever lock (if fitted)

VISIBILITY

The visibility maps show machines in standard build and travel configuration.

The maps provide an approximate indication of what can be seen by the operator and any blind spots when seated in the driving position wearing a seatbelt.

The maps have been provided to assist the operator / user and may be used as part of a risk assessment for the safe operation of the machine.

The machines are compliant with the visibility requirement given in EN 474-1 with regards to the rectangular boundary and a test object of 1.2m high and 0.3m wide and the 12m circular boundary.

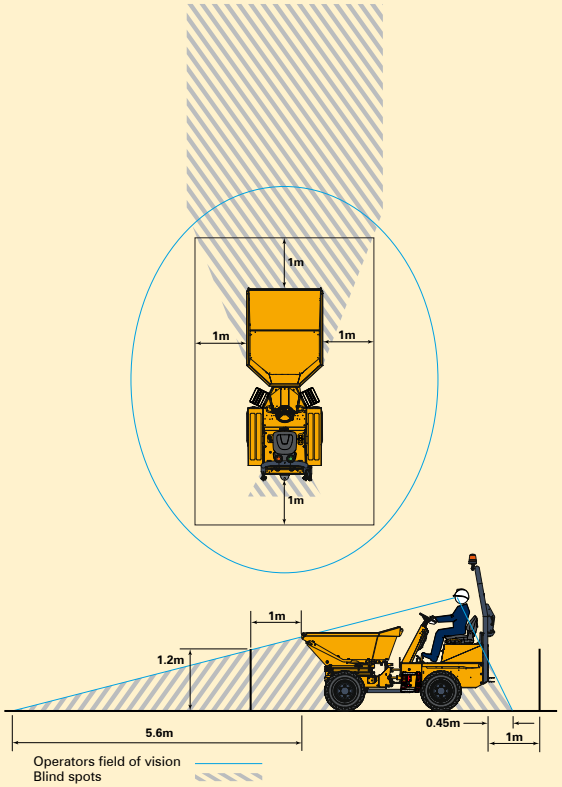
- Check all around the machine before operation.
- Be sure all mirrors are adjusted before operating the machine (if fitted).
- All cameras and mirrors must be kept clean (if fitted).
- Be aware of all blind spots.

The blind spot areas marked on the plan views of these maps are ground plane only

⚠ WARNING

Camera angles are factory set, any modifications to the machine configuration by any end user that my result in the restriction of visibility and will require a new risk assessment to be performed.

Mach 2023



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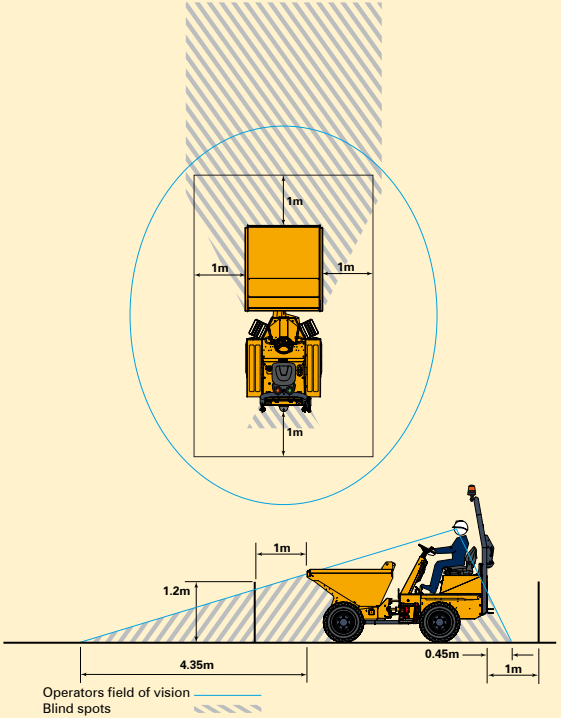

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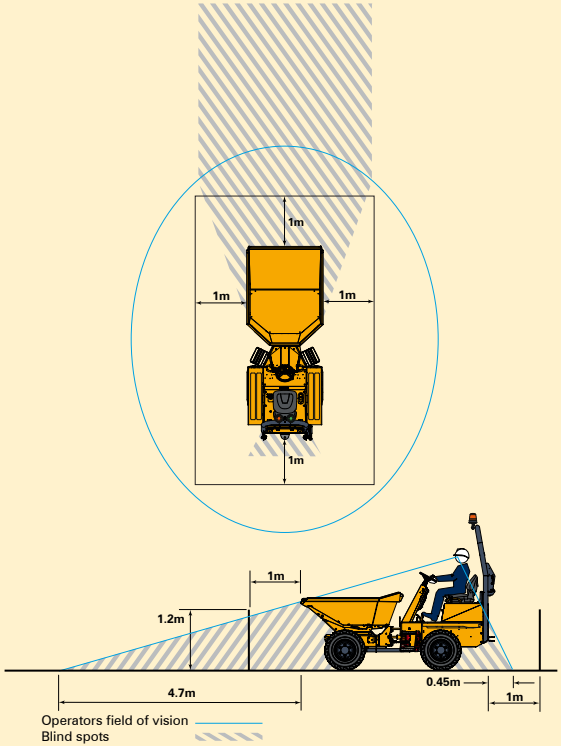
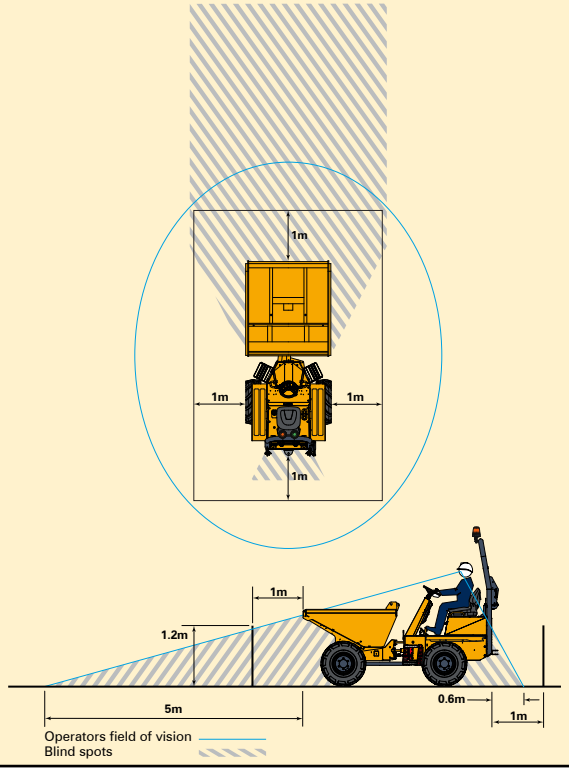
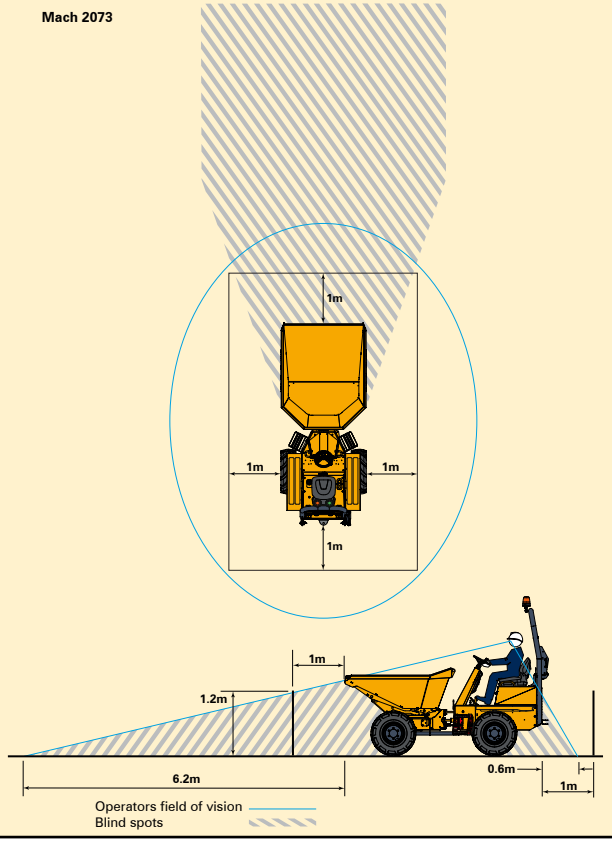


Mach 2070

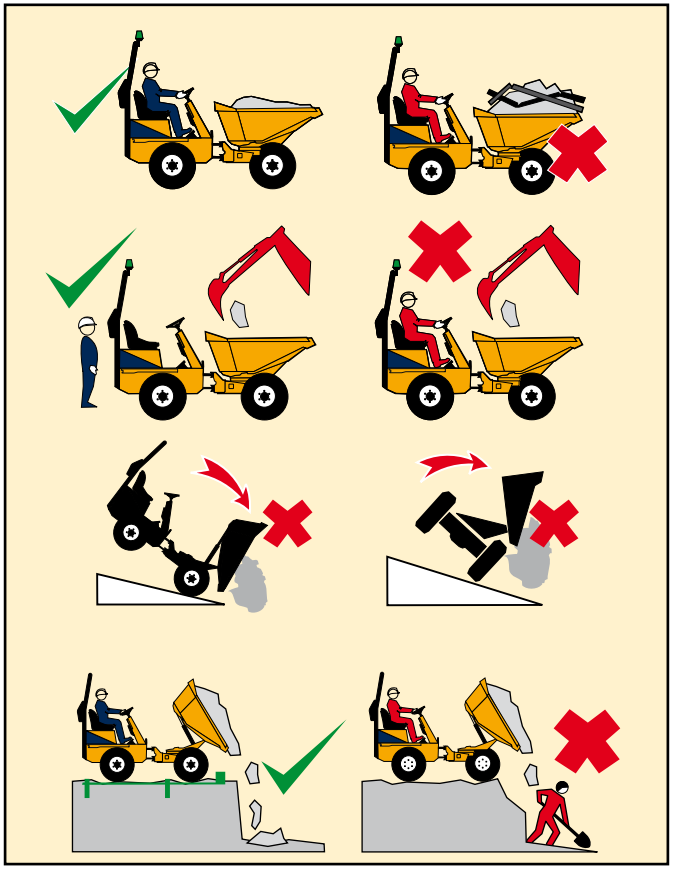


Mach 2073



3 ⚠ **WARNING** HAZARDS OR UNSAFE PRACTICES WHICH **COULD** RESULT IN SEVERE PERSONAL INJURY OR DEATH

Thwaites



LOADING THE MACHINE

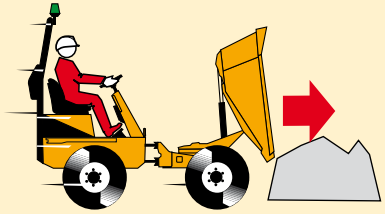
- ✗ **DO NOT** exceed the machine's rated capacity
- ✓ Activate the hand brake, set drive to neutral, turn the engine off, disembark the machine, and stand clear
- ✓ Clear any debris from controls
- ✓ Ensure SAFE STABLE LOW load which allows good visibility
- ✓ Reduce payload if materials being carried are not free flowing

UNLOADING THE MACHINE

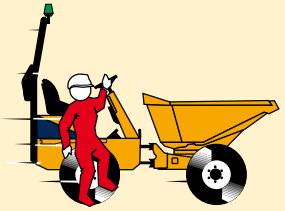
- ✓ Use **STOPBOARDS** and **SUPPORT** walls on trenches
- ✗ **DO NOT** tip skip if load is sticking
- ✗ DO NOT discharge load when working on sloping ground

Attention! Section 3 *correct and incorrect working practices*

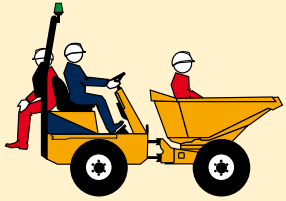
DRIVING



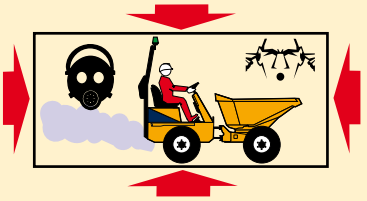
DO NOT drive with the skip tipped (bulldozing)



NEVER dismount from a moving machine

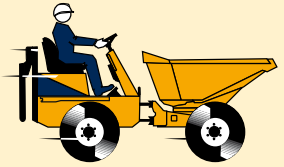


DO NOT carry passengers

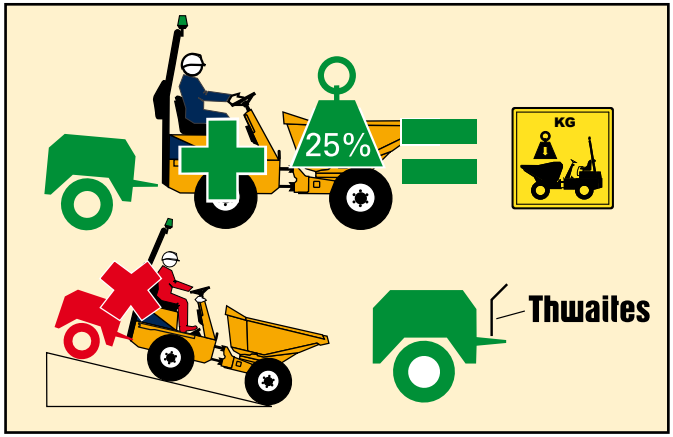


Avoid confined work areas - exhaust fumes and noise can be a hazard

Site hazards to avoid: adverse weather conditions; icy surfaces; people



DO NOT operate with the ROPS frame folded down



TOWING A TRAILER

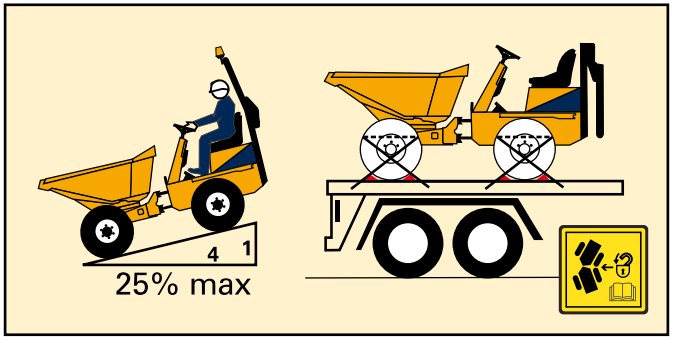
Place ballast load in skip. This load should be a minimum of 25% of the machine's rated payload.

Gross weight to be towed plus the ballast load **MUST NOT** exceed rated payload of machine.

DO NOT exceed maximum tow bar pull or vertical load.

Towing must not be carried out on sloping ground.

Always use Thwaites-approved towing pin.



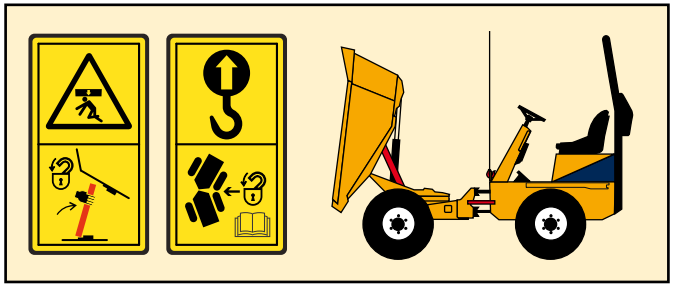
TRANSPORTATION

When transporting or storing machine with the ROPS frame folded down remove beacons and secure beneath the bonnet.

Reverse machine slowly onto a suitable trailer.

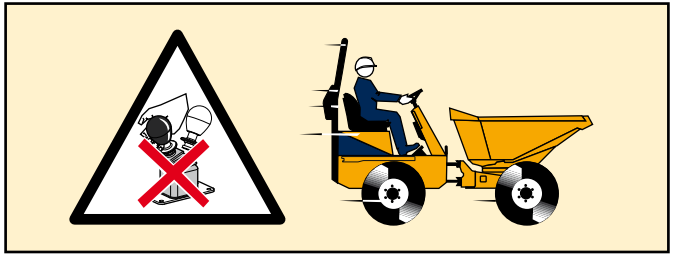
DO NOT drive the machine forwards when loading.

- Apply hand brake
- Stop engine
- Chock wheels *(To prevent movement)*
- Engage chassis locking bar
- Secure to trailer
- Ensure legal load *(Height/weight)*



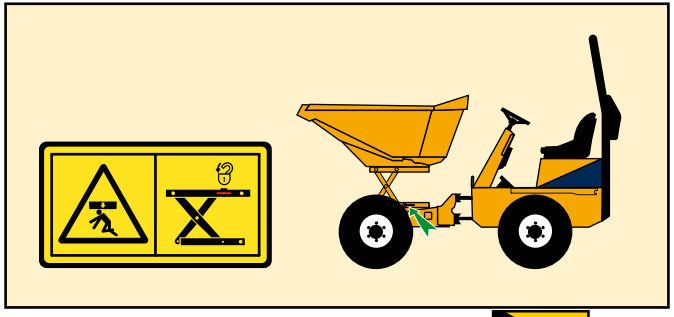
LIFTING

Tip skip fully forward
Engage skip safety prop
Engage chassis locking bar
Lift using centre eye provided



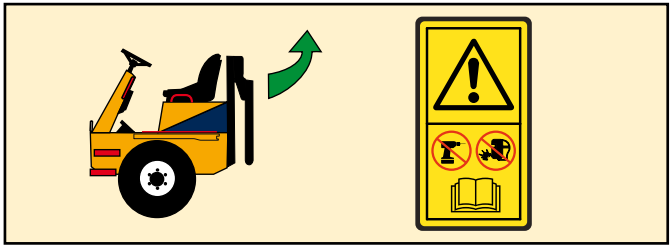
HAND BRAKE

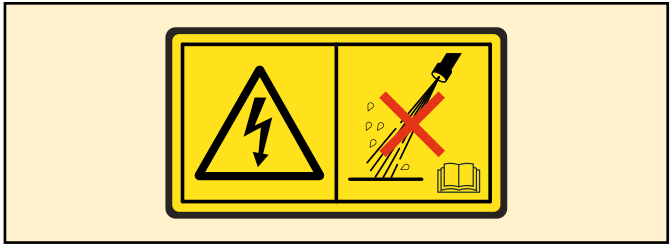
DO NOT apply hand brake if machine is moving (except in an emergency)



SCISSOR LIFT

Insert locking pin when working beneath skip





HINGED ROPS

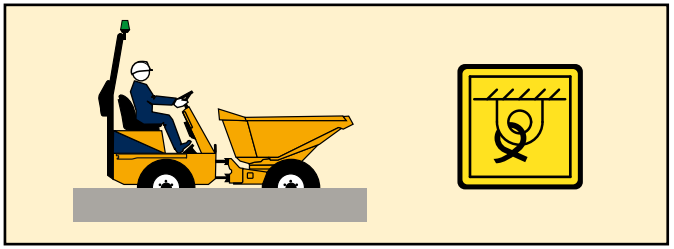
Use grab handles, tread grips (if fitted) and steps when standing on the machine to lower the ROPS frame.

Avoid wet surfaces.

Never modify structure

ELECTRICAL SYSTEM DAMAGE

When pressure washing the machine avoid electrical system or component damage. DO NOT aim directly at electrical components housed beneath the engine cover or located within the instrument panel.



MACHINE RECOVERY

Towing procedure

Ensure towing straps or chains are suitable for the machine to be towed. (1.5 time more than the gross weight.)

Tow the machine using the front tie down points or around the rear axle.

Tow the machine in neutral with the engine running.

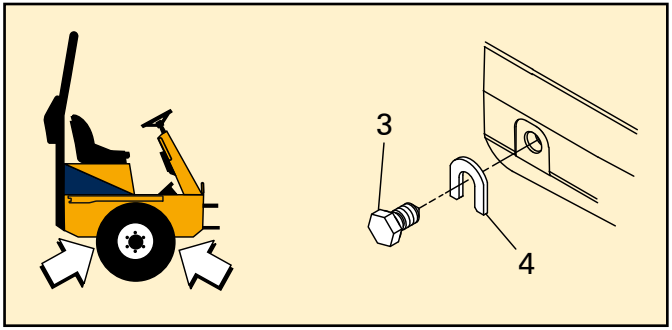
Moving a disabled machine

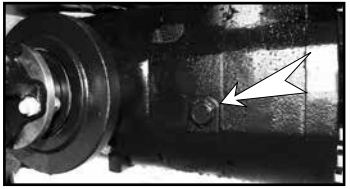
Towing or pushing a disabled machine can only be done after the following has been carried out.

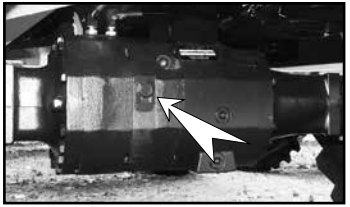
- Handbrake emergency release procedure.

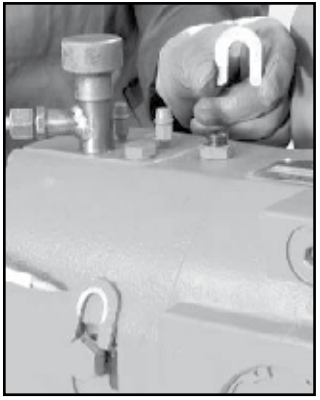
⚠ WARNING

If rear axle brakes are not disengaged damage will be caused to transmission and hydraulics.









To release the fail safe brake:

- Loosen the two screws (3) on the axle housing and remove the spacers (4).
- Tighten the screws (3) by hand until they are in contact the internal pusher plate. After tightening the screws, alternatively, for ¼ of turn on each side, with a wrench until they are completely tightened.

RESET OF FAILS SAFE BRAKE FUNCTION

- Loosen again the screws (3) alternatively for ¼ of turn on each side and fit in the spacer (4) between the screw head and the axle cover.
- Tighten the screws (3) completely against the spacer with torque of 95 - 115 N·m.

TOWING THE MACHINE

- The maximum towing speed of 2 km/h should not be exceeded.
- The towing distance should not exceed 1 km.

4 Troubleshooting

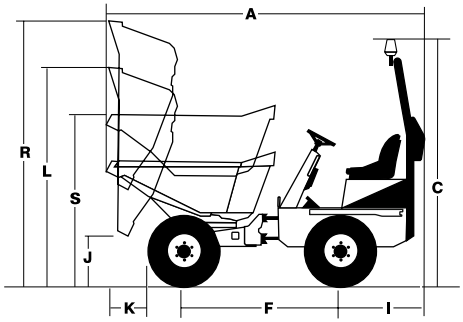
Thwaites

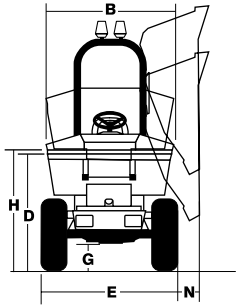
Problem	Reason	Solution
Engine will not start	Isolator switch OFF Clutch not depressed Battery voltage too low Faulty fuel supply Electrical stop on fuel pump defective Circuit breaker tripped Seat belt not fastened (if green beacon fitted)	Switch on Depress clutch pedal Check battery and connections Check fuel level and connections Check connections Rectify electrical fault and reset (push to reset) Fasten seat belt
Complete loss of electrical functions	Maxi fuse blown	Rectify electrical fault and replace fuse
Starter motor will not operate	Faulty battery	Replace
Maxi fuse blown	Faulty starter motor/solenoid (Current drawn by solenoid exceeds 25A) Short circuit on main feed or starter solenoid cables	Replace starter motor/solenoid and maxi fuse (only replace with a 30 amp fuse) locate and repair
Engine stops soon after start-up	Blocked fuel or air filter Air in fuel system	Replace fuel or air filter Check fuel line connections
Black engine smoke	Air filter clogged (air filter indicator is red) Fuel system defect Wrong fuel	Replace or clean air filter Contact Thwaites dealer Replace fuel and filter
 ● Engine oil pressure	Low oil level	Top up engine oil
 ● High engine temperature	Radiator choked Low coolant level	Clean radiator Top up coolant
 ● Irregular alternator	Defective or loose alternator belt	Adjust, or, if necessary, replace alternator belt
 ● Transmission oil temperature	Oil cooler choked Over/under filled with oil	Clean oil cooler Correct oil level
 ● Transmission oil pressure	Low transmission fluid level	Top up transmission fluid
 ● Low brake oil	Check oil level/leaks	Top up brake oil
Warning buzzer sounds	Hand brake ON	Release hand brake

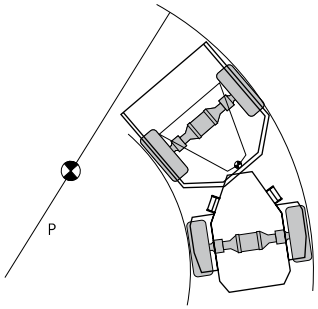
Always check panel warning lights, tripped circuit breakers or blown maxi fuse

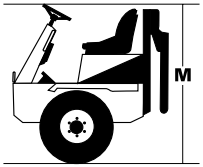
4 Powerswivel and Hi swivel – data chart

Thwaites









Dimensions (mm)		2T	2T Hi Sw	3T
A.	Length	3726	3726	3934
B.	Width	1471	1471	1638
C.	Height (ROPS & Beacon)	3053	3053	3180
D.	Skip lip height	1356	1479	1456
E.	Width over tyres	1488	1488	1650
F.	Wheelbase	1850	1850	1950
G.	Ground clearance	282	282	337
H.	Skip load height	1416	1536	1581
I.	Axle to rear	1042	1042	1042
J.	Tipping ground clearance	728	1236	751
K.	Tipping tyre clearance	475	525	546
L.	Height tipped (skip)	2671	3152	2841
M.	Height (ROPS folded)	1926	1926	1981
N.	Tipping side clearance	189	239	388
P.	Tyre clearance diameter (m)	7.4	7.4	9.2
R.	Max height tipped (raised skip)	3642		
T.	Skip lip height (raised skip)	1971		

Weight (Kg)	2T	2T Hi Sw	3T
Unladen			
Front axle	700	920	770
Rear axle	1300	1340	1350
Total	2000	2260	2120
Rated payload (including driver at 80 kg)			
Laden	2000	2000	3000
Front axle	2510	2760	3460
Rear axle	1570	1580	1740
Total	4080	4340	5200
Towbar (Max)			
Pull load	1500	1500	2250
Vertical load	375	375	375
Tyre Pressure			
Bar (psi) Front	3.5(51)	3.5(51)	3.6(52)
Rear	2.3(33)	2.3(33)	2.0(29)

Noise

Airborne (10m)

L_{WA} 101 dB

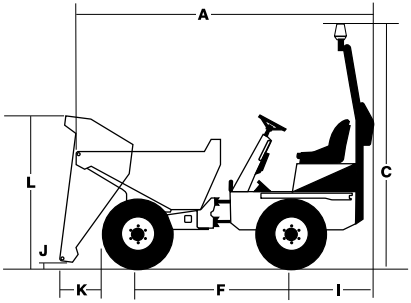
Operator

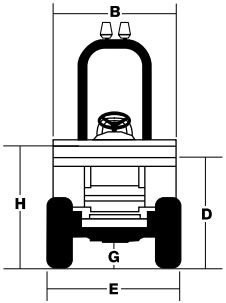
L_{pA} 84

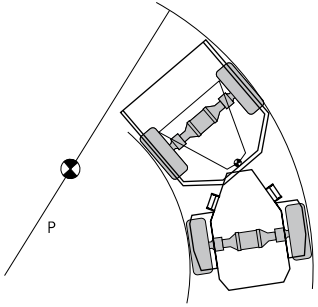
Typical vibration levels - whole body 0.7 - 0.8 m/s². Hand/arm less than 2.5 m/s².

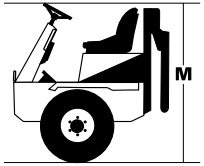
4 Forward tip – data chart

Thwaites









Dimensions (mm)		2T	3T
A.	Length	3603	3785
B.	Width	1490	1650
C.	Height (ROPS & Beacon)	3053	3108
D.	Bucket lip height	1346	1381
E.	Width over tyres	1488	1650
F.	Wheelbase	1850	1950
G.	Ground clearance	282	337
H.	Skip load height	1431	1524
I.	Axle to rear	1042	1042
J.	Tipping ground clearance	278	321
K.	Tipping tyre clearance	594	603
L.	Height tipped (skip)	2001	2131
M.	Height (ROPS folded)	1926	1981
P.	Tyre clearance diameter (m)	7.4	9.2

Weight (Kg)	2T	3T
Unladen		
Front axle	580	620
Rear axle	1300	1350
Total	1880	1970
Rated payload (including driver at 80 kg)		
Laden	2000	3000
Front axle	2290	3140
Rear axle	1670	1910
Total	3960	5050
Towbar (Max)		
Pull load	1500	2250
Vertical load	375	375

Tyre Pressure		
Bar (psi) Front	3.5 (51)	3.6(52)
Rear	2.3 (33)	2.0(29)

Noise

Airborne (10m)

L_{WA} 101 dB

Operator

L_{pA} 84

Typical vibration levels - whole body 0.7 - 0.8 m/s². Hand/arm less than 2.5 m/s².