


Procedure Title				Operation of trailer mounted hydraulic soil corer					
SOP Number				TBC					
School/Business Unit				ERS		Location (building/lab/ workshop if applicable)		Stored in W022 Engineering Workshop	
SOP Development Date				21/4/21, amended 21/02/2022		Prepared by		C Birchall, P Hosking Amended Richard Flavel & Oliver Knox	
SOP Review Date				21/4/23		Version #		3	
Equipment Details:				Box trailer with hydraulic soil corer driven by Honda motor.					
									

Relevant Australian Standards / Codes of Practice / Legislation

- The following guidance must be read by all people towing, operating or assisting with the operation of the trailer unit. Transport for NSW Guidance document - [Towing a trailer or caravan](#)

Chemicals and Relevant Safety Data Sheets (can be obtained via UNE subscription to ChemWatch)

- Fuel – Petrol

Plant & Equipment Required

- Trailer mounted soil corer

Licenses Required

- Current trailer registration for the entire period of the fieldtrip.

Competencies Required

- Passed out on this SOP. Person towing trailer must be on a full drivers licence. Restricted P1 and P1 licence holders cannot tow this trailer.

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WHS F059	WHS OP021	1.0	23/10/2017	23/10/2020	1	22/02/2022

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DO NOT use this machine or perform this task unless appropriately instructed in its safe use and operation, and permission has been given.

Section 1 - PPE Required								
	Dust Mask	Face Shield	Foot Protection	Hair Net	Protective Clothing	Respirator	Sun Protection	Breathing Apparatus
Compulsory			X				X	
As needed								
	Hand Protection	Hearing Protection	Safety Glasses	Safety Harness	Safety Helmet	Safety Vest	Apron/Lab Coat	Welding Mask
Compulsory	X	X	X					
As needed								
Additional PPE/Notes								

Section 2 – Procedure
<p>PRE-OPERATIONAL SAFETY CHECKS</p> <ul style="list-style-type: none"> The trailer is roadworthy and registered All tyres are properly inflated including the spare Tools are available to change the tire including jack and wheel brace All lights work (licence plate, indicators, park lights and brake lights) and safety chains are properly connected <p>OPERATIONAL SAFETY CHECKS</p> <ul style="list-style-type: none"> Petrol container is secured in the trailer. Petrol containers are NEVER to be carried inside the cabin of the tow vehicle due to high fire risk in the event of a crash. This may require the trailer to be used to transport the empty petrol container for refilling. Spill kit is present in the trailer and fully stocked.

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- All coring tubes (without extraction collars) where extraction rings are used have retaining o-rings installed <25cm from the top and spare o-rings are stocked.

POTENTIAL HAZARDS

- Only have one person operating the hydraulic corer at a time.
- Make sure that others are standing at least 2m away from the corer and trailer, to avoid distracting the operator, and to avoid getting caught in the equipment.
- Do NOT use hands to adjust extraction rings while the equipment is operating. All extraction operations using extracting rings should be possible without touching the coring tube.
- If anything goes wrong, release and step away from the controls and the hydraulic movement will stop. If the control does not work press the red Emergency Stop button which will stop the engine.
- You must wear hearing and eye protection when using the corer, especially when using the jackhammer attachment.
- If there is an oil leak, turn off the motor before investigating the source. A fine jet of pressurised hydraulic oil can penetrate the skin and cause serious medical problems.
- Do not travel with the hydraulic ram in the extended position as it is susceptible to damage from sideways movements created when travelling over rough ground. ALWAYS lower it before moving the trailer.
- If you are moving a short distance (a few metres) over smooth ground, then the mast can stay upright. In all other situations, the mast should be lowered before moving.
- Never refuel a hot engine.
- The trailer works in the open, so be SunSmart – wear long clothes, broad brimmed hat and sunscreen.
- Transport of petrol and potential fire risk. Must be carried in the trailer or on the back of a ute. Never inside a cabin of a vehicle. The fuel tank should only be refuelled before starting the engine at the beginning of the day. Refuelling during the day can only occur if the engine has cooled for at least 20 minutes.
- Trailer must always be secured to the tow vehicle when raising the mast as upwards pressure on the connection at this stage will lift off an unsecure tow ball.

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FEATURES OF THE SOIL CORER

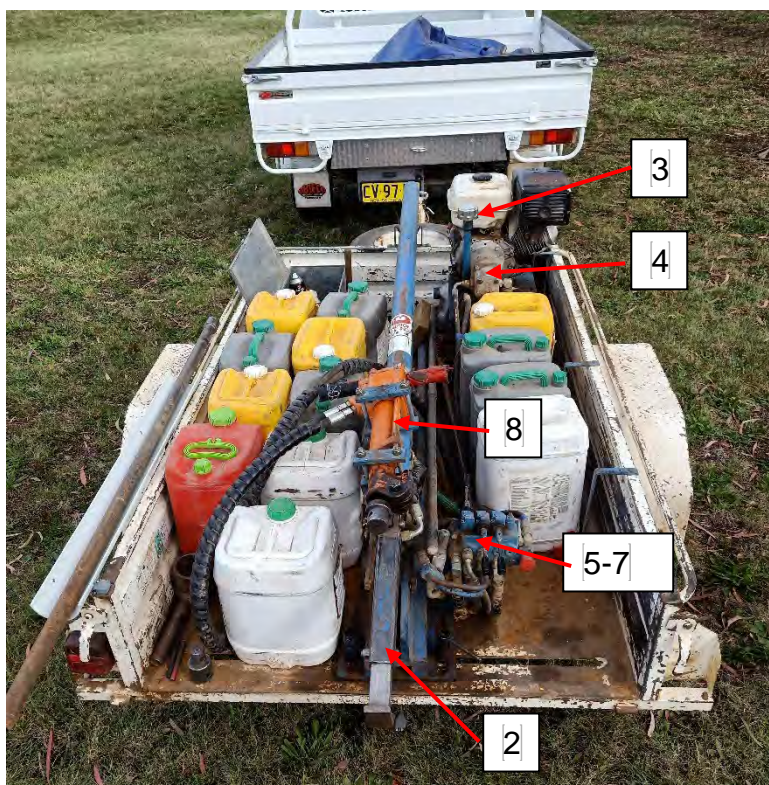


Figure 1 Hydraulic soil corer layout

1. Steel box trailer.
2. Trailer leg - removable foot.
3. Petrol engine
4. Hydraulic pump
5. Control valve A (tilt)
6. Control valve B (up/down)
7. Control valve C (hammer on/off)
8. Hydraulic hammer

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Figure 2 Trailer with mast up

1. Mast in vertical position and ram extended
2. Hammer, adaptor, bolts and coring tube
3. Removable foot

Alternative extraction method:

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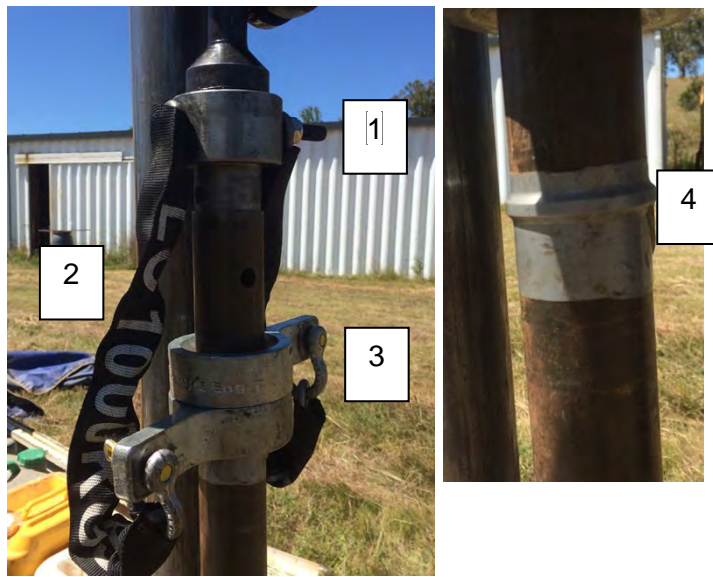


Figure 3 extracting rings method

- 1) High tensile bolt to secure extracting rings chains
- 2) Chain covers
- 3) Extracting rings
- 4) O-ring extracting ring retainer to allow hands free extraction

PREPARING THE TRAILER

Take the vinyl cover off the trailer and place it in the towing vehicle (so it doesn't get left behind when you finish).

Make sure the trailer is securely attached to the vehicle. This is essential when removing cores as there will be upwards pressure on the tow connection at this stage.

Remove the tailgate plug and tailgate hinges and either place it in the towing vehicle, or on the front of the trailer on the provided brackets.

Place the PVC holder for soil coring tubes on the left side of the trailer. This is where coring tubes will be placed after they are extracted.

STARTING THE PETROL ENGINE

1. Check oil and fuel levels in the motor while cold and on level ground
2. Turn the fuel valve to the ON position.
3. Ensure jackhammer control valve C is off.
4. Close the choke.

Note: Do not use the choke if the temperature is high or the engine is warm.

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5. Check that the engine “kill” switch is in the ON position.
6. Position the throttle control lever for a moderate idle speed.
7. Pull the starter cable lightly until resistance is felt, then pull back briskly until the engine fires.
8. As the engine warms up, move the choke to the OPEN position. This should be possible several seconds after starting. After idling for a minute to warm the engine, you can change to the desired engine speed. For normal coring, this is around 2/3 speed. When using the jack hammer attachment, use full speed as the engine doesn't provide enough power to effectively run the hammer at lower speeds.
9. After the engine has been run for a while, test the Emergency Stop button. With the engine running press the Emergency Stop which should stop the engine immediately. As this is a high potential fault the this needs to be fixed before coring can commence.
10. Following the Emergency Button test, rotating the emergency button will release to allow the engine to be restarted. Restart the engine as per point 7.
11. The throttle can be left in the desired position when turning off and starting the motor, and the choke should not be used.

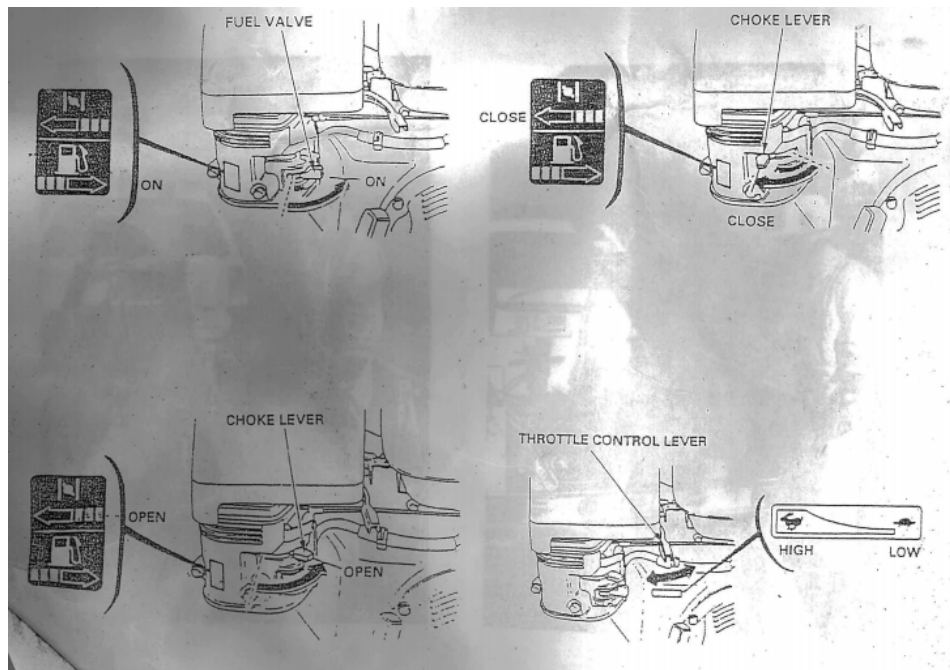


Figure 4 Position of fuel valve and choke, and throttle on Honda petrol motor

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CORING FOR SOIL SAMPLES

Insert the hammer into the end of the jack hammer attachment, and make sure that the hole is aligned across the trailer. Ensure that the hammer locks into position. Attach the appropriate adaptor to the bottom of the hammer and fix in place with a nut and bolt (Figure 2 or 3). If using the ring method for extraction, also attach the chains and rings to the bolt.

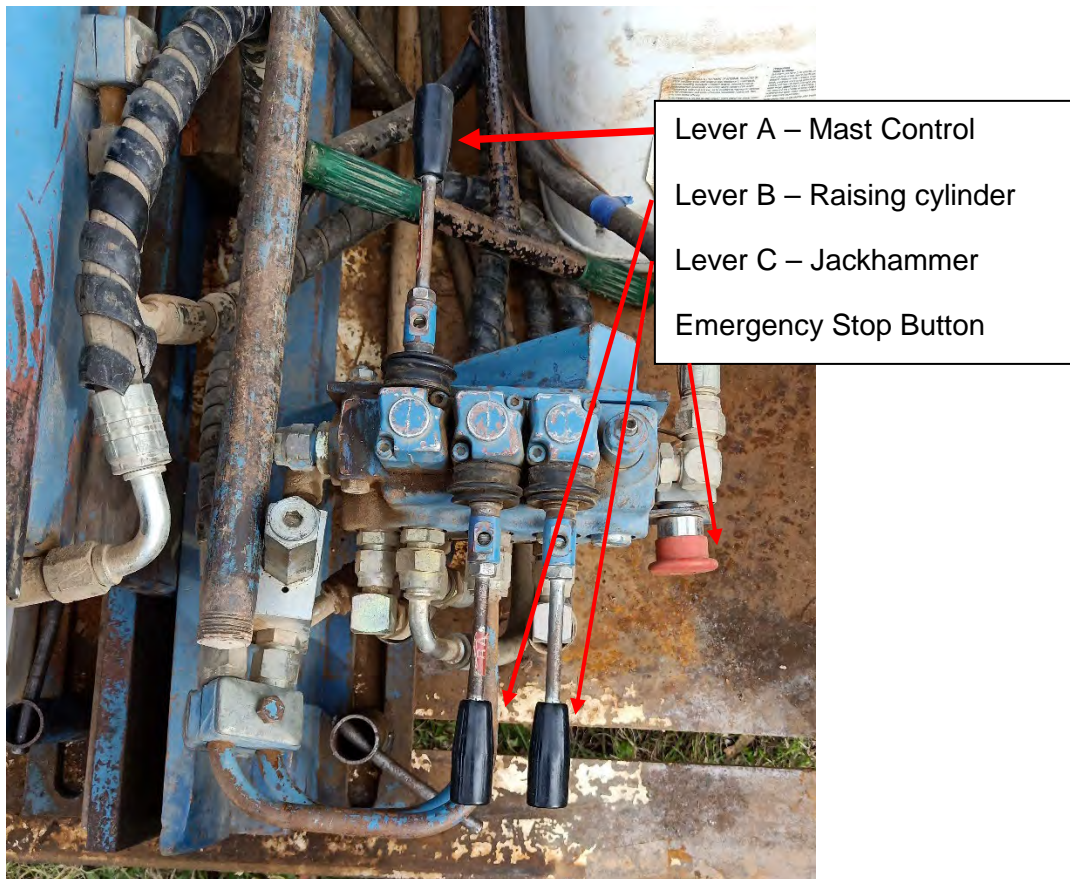


Figure 5 Controls for operation of hydraulic systems.

Tilt the mast to the vertical by pushing lever A (Figure 5) down.

Pull lever B up to raise the hydraulic cylinder (Figure 5) so the coring tube can be attached.

Connect the sampling tube to the adaptor, inserting a bolt through the holes in the top of the tube and the bottom of the adaptor.

Alternatively, if using the rings, ensure that an o-ring is fitted to the tube <25cm from the top end, and inspect it to make sure it will prevent the extracting rings sliding down the tube under percussive shock from the hammer function. Then place the longer extracting ring (Figure 3) over the

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tube first, followed by the shorter extracting ring, and lift the coring tube to fit over the hammer.

Stand near the control levers and away from the hydraulic mast, and make sure that your feet are not under the coring tube tip.



Figure 5 No go zone when operating the hydraulic systems.

Push lever B down to lower the coring tube, guiding the leading tip to the desired position on the ground. Once the tube has contacted the ground, remove your hand and use lever B to force the tube into the ground.

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The depth to which the soil sampling tube will go, without the assistance of the jackhammer, will depend on how soft the ground is. The coring tube will stop before the hydraulics lift the trailer off the ground, as the hydraulic relief valve pressure has been adjusted to below this point.

The tires of the trailer must never be lifted off the ground when driving the tube into the ground. Lifting the trailer off the ground could cause the trailer to shift side-ways and put a significant load on the mast and corer

When the tube will go no further, use the jackhammer to help drive it to the desired depth. To start the jackhammer, push lever C down until it locks into place, and open the engine throttle.

When the jack-hammer can no longer push the tube further into the ground or you have reached the desired depth, release lever C to stop the jackhammer and reduce engine speed to about half-throttle.

Be aware that buried stones can bend parts of the cutting tip of the soil corer, and that using the jack hammer can make this damage much worse.



Figure 5 (The soil sampler can be positioned to the left or right side of the trailer by pushing it along the track built into the floor.)

TAKING THE TUBE OUT OF THE GROUND

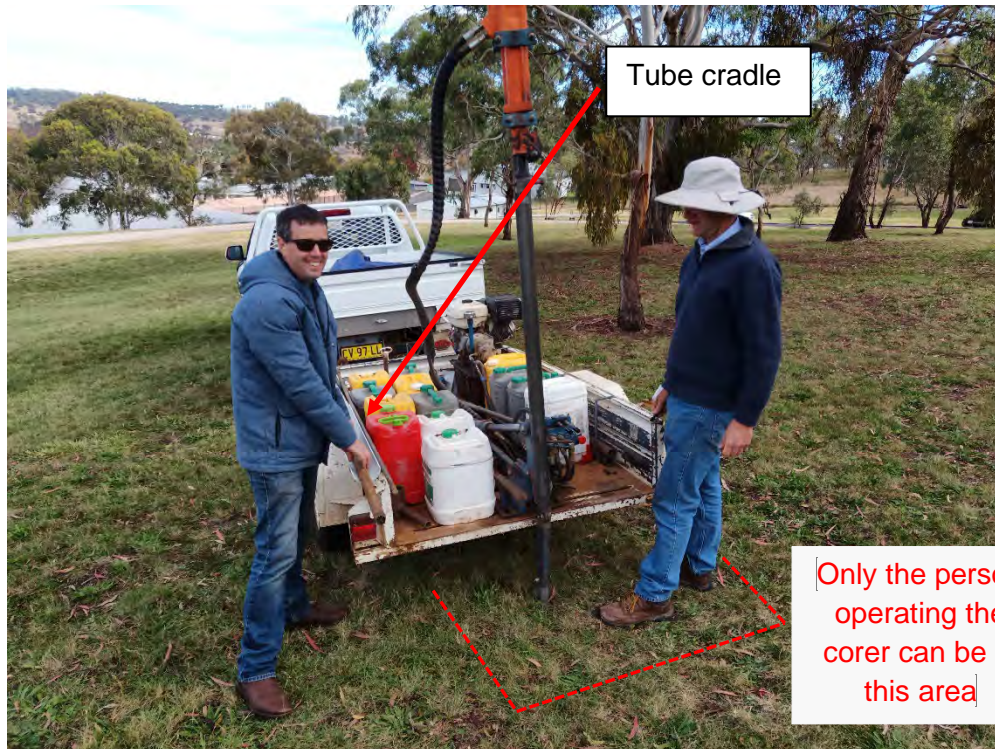
Check that **either** the bolt is still pinned through the top of the coring tube and the adaptor **or** that the extracting rings allow clearance of the hammer when the hydraulics extend. This is required to ensure the tube is not bent when the angle of the mast shifts under load. Keep hands clear of the extracting tube **and mast** for the duration of extraction process.

Raise the hydraulic ram by lifting lever B, until the end of the coring tube clears the surface by ~10cm.

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Hold and lift the tube while removing the bolt/extracting rings, then remove the coring tube from the adaptor.

Place the tube on the cradle on the left side of the trailer, or hand it to your colleagues, before doing anything else. Never rest the core tube on your foot even if unattached from the hydraulic hammer.



Lower the ram to the starting position, before moving the trailer.

If cores are difficult to extract, and the trailer suspension is being compressed excessively as the core is being extracted, then you should attach the removable foot to the base of the mast/corer. This will contact the ground and reduce trailer movement. Remember to remove the foot before leaving the site.

TURNING OFF AND PREPARING FOR ROAD TRAVEL

When coring is finished, lower the ram to trailer floor level, and remove the adaptor. Lower the mast to the horizontal position.

Stop the engine and turn the fuel switch to off.

Attach the tailgate and cover before leaving the site.

TROUBLE SHOOTING

If the jack hammer doesn't improve the ability to take cores.

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The jack hammer has a nitrogen filled accumulator as a buffer in the hydraulic system. If the accumulator bladder is ruptured, it will not work effectively, although the jack hammer will still make a lot of noise. You may notice that the hydraulic hoses flap more than usual. A hydraulics company can pressure check the accumulator, and replace it if necessary.

The jackhammer requires a lot of oil, so the engine needs to be run at full speed for maximum effect.

SPECIAL NOTE

NO PERSONNEL ARE TO USE THIS EQUIPMENT PRIOR TO OBTAINING:
 COMPETANCY IN THE CORRECT USE OF THE EQUIPMENT
 READING AND FULLY UNDERSTANDING THE OPERATOR'S MANUAL
 READING THE STANDARD OPERATING PROCEDURE
 UNDERGOING THOROUGH PRACTICAL TRAINING WHILE PROPERLY
 SUPERVISED

Section 3 - Spill Procedure and Waste Disposal (If applicable)

If there is a hydraulic oil or petrol spill use the spill kit absorbent materials to soak up. Once absorbed scrape up and place in the plastic bags for offsite disposal.

Section 4 – First Aid

There needs to be at least one person with first aid qualifications present when the corer is operated. If there is only one, this person should not be operating the corer.

Section 5 – Incident Management / Emergency Procedures

Before travelling to sampling site, ensure that communication is possible in case contact is needed due to an emergency. If mobile phone coverage is poor/non-existent, and UHF radio contact with the landholder is not possible, then borrow the ERS satellite phone. Ensure batteries are charged before the trip.

Read the risk management section of the trip approval document to check on specific risks and their management for your trip.

Approval of SOP

Name	Julius van der Werf	Title	Prof/ HoS ERS
Date	21-Feb-2022	Signature	

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WHS F059 Standard Operating Procedure (SOP)

Sign Off

The University shall provide information and training to workers to enable them to perform tasks safely. This section is signed by workers (and supervisors) to indicate their understanding of the Standard Operating Procedure and indicates their competence to complete the job in a safe manner as deemed by their supervisor. Workers should always consult with their supervisor where there is concern about the safety of a task that effects themselves or others.

Date	Worker Name	Worker Signature	Supervisor Name	Supervisor Signature

Records Storage Instructions

All completed SOPs are to be recorded in TRIM Container A17/2181 utilising a TRIM license in your School/Business Unit. Completed SOPs are to be published on Safety Hub for ongoing utilisation.

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