



Aldridge Piling Equipment (Hire) Co Ltd
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Responsibility for the work equipment and imposed duty of regulation

Aldridge Piling Equipment's duty under the Health and Safety at Work Act and The Provision of Work Equipment regulations as amended - PUWER 98 Regulation 3 paragraph 3, is only to the extent that we have control over the equipment that we hire. i.e.

- x to provide equipment that is suited to the task,
- x to provide information and instruction on safe methods of work and residual hazards.
- x The equipment being supplied has been inspected and maintained.

APE has no control over how the hirer uses the equipment, or any deterioration of the equipment that may occur during the hire. Note these extractors are unsuitable for Domex sheets, Mabey Multilock, DMP500 etc.

Tractomat
 IV

Zenith
 20 & 80



Note: Due to the increased familiarity with vibrators used as extractors, be this a suspended or excavator mounted variant, it is important to stress that these pneumatic impact extractors are used differently.

Primarily, sheets cannot be fully extracted from the ground due to the use of a friction grip rather than a clamp. A friction grip requires both a pulling force and a reaction force to engage. Once loose, there is insufficient reaction to maintain the grip and the pile will be released.



Activity : - PILING OPERATIONS

Notes:

1. The following hazard list applies specifically to the following types of hammer:
 - a) excavator mounted (EMV) type
 - b) suspended (remote powerpack) type
 - c) air hammers and extractors
2. The following standards apply specifically to piling operations:
 - a) EN996: 1996 – Piling Equipment – Safety Standards
 - b) BS5228 Part 1 1997 – Noise and vibration control on construction and open sites
3. Many hazards associated with piling equipment can be avoided if a personnel exclusion zone of 15m is maintained around the pile during piling operations.
4. Both the operator and his supervisor should be familiar with the operation of the piling equipment having read the suppliers instruction manual and have received sufficient training prior to commencing work.
5. Personal protective equipment e.g gloves, hard hat, goggles, ear defenders, high visibility jacket etc should be used at all times during piling operations.
6. Pile driving hammers are designed to transfer extremely high loads from the hammer into the pile and the surrounding soil. The forces are so high that without proper maintenance and skilful operation the equipment is considered as self-destructive.

| 2. Air Power Impact Extractors | | |
|---------------------------------------|---|--|
| Hazard Associated with Activity | precautions to be taken to reduce the risk | comments |
| Noise | Follow the guidance given in BS 5228 as referenced above. Maintain a 15m exclusion zone as noted above. Operatives must wear ear defenders at all times Keep access doors on the compressor shut. | |
| Fracture and/or failure of components | Regular inspection of the extractor should take place particularly for cracking to the wedges and grip pins Ensure operator has suitable training and experience and is familiar with the suppliers operating instructions. | Ensure that the extractor is operated under a pulling force, never allow the extractor to work slack, as it will rattle itself to pieces. Do not over compress the shock absorbing spring. |
| Oil Mist | Correct air line oil lubrication should be maintained Maintain the personnel exclusion zone when the hammer is operating, do not stand directly in line with the exhaust ports. | |
| Compressed Air | Ensure all hoses couplings clamps are regularly inspected and in good order Switch off compressor and de compress prior to removing hoses | Ensure that the operators manual for the compressor is adhered to. Use hose retainers to avoid whiplash if hose ruptures during use |
| Falling components or piles | Maintain 15m exclusion zone when hammer is operating Never attempt to use the extractor to simply release clutch friction of a pile previously extracted or partially extracted. The possible movement upon impact can easily overcome this friction creating a upward projectile. Never full extract a pile from the ground using the extractor alone. The Friction Grip will fail if little reaction force. | Use a secondary chain or sling that secures the pile separate from the extractor to the lifting equipment |

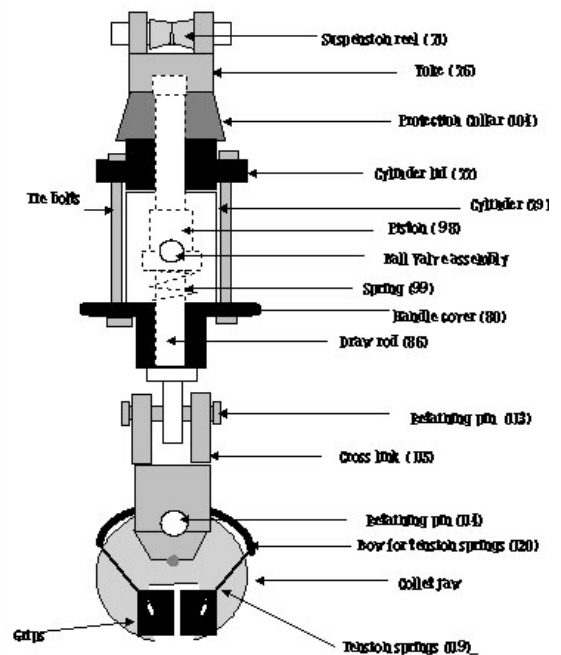
Tractomat - Model IV

The tractomat extractors are small air powered extractors, that unlike vibrators rely on a friction grip.

A fork accessory will be provided that will enable you to lever down the gripping dies around the pile, as your lifting equipment starts to increase the line pull.

Major Components

Like many other hammers the tractomats have segmented bodies. In this instance there are four principle parts. The yoke (76), upper cylinder lid (77), the main cylinder (79) - which houses the valve mean, and handles cover (80) or bottom cylinder lid.



The assembly being held together by two tie bolts (cylinder screws 83) which attach through extensions in the upper cylinder lid and the handle cover. The main cylinder effectively being clamped through it being sandwiched between the two as the security nut (74) is tightened

The tractomat should be checked for any damage to springs or other missing or damaged structural items. The tie rod nut should be very tight, apply more loctite if required. The grips should be oiled at their rear and the serrated surfaces cleaned with a wire rope. The wire rope should be check to ensure that it is not damaged by fraying or from being squashed.

Limitations

With any extractor, in addition to the impact force generated, you will need to apply an upward line pull. The maximum pull that can be applied to the Tractomat IV is 5 tonnes, work as close to this as possible as it reduces the wear on the extractor. However, do not exceed this amount else the tie-rods may stretch and break, leading to disassembly of the extractor.

This type of extractor works more through persistence than power, and therefore you may need to work a panel of sheets, spending 3 -5 minutes per sheet. Acting on alternate sheets on a panel has the greatest effect, as does starting with the last pile driven. NEVER spend longer that 5 minutes on a specific pile that has refused to work, work the panel.

Remember, the hardest part of extraction process is the initial movement, which then gets progressively easier.

Never fully extract a sheet from the ground as the grip may fail, due to the reduce reaction reducing the strength of the friction grip.

Use a quick release shackle at all times.



The Zenith Extractors

These are air powered extractors. There exist two model sizes within this type of hire plant, the Zenith 20 & 80. For the purposes of maintenance, they are included together since they feature components that differ only in size.

Major Components

The maintenance requirements for this type of equipment is mostly structural as the actual working mechanism is very simplistic even compared to other air hammer/extractor units. In many respects this type of equipment resembles an impact hammer upside down, fitted with an extraction grip.

There is no valve means in this type of extractor, the reciprocation of the piston being obtained through a combination of the weight of the piston and the mechanical blocking of air ports in chambers above and below flanges of the piston, by the piston itself, as it moves.

Like most air hammers, this extractor comprises of segments either bolted together or connected by pins and cross links. The extractor features a main body comprised of the cylinder head, main cylinder body and body head. These are each connected by large bolts. The Cylinder head encloses the anvil or crosshead, whilst the cylinder body houses the main piston, and the body head the main spring. In addition two cross links connect from the crosshead (anvil) of the extractor, through to the grip retaining pin which provides a direct connection of the top impact surface to the gripping element (jaw and grip dies).



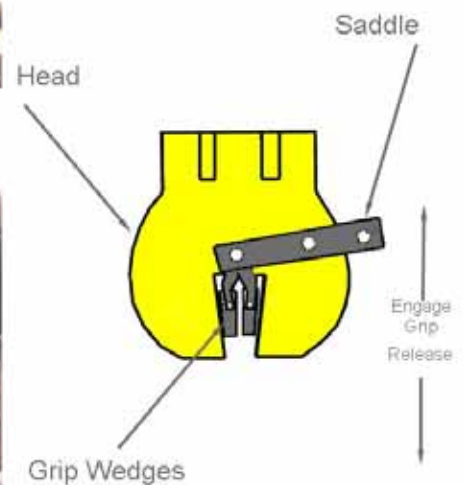
Limitations

With any extractor, in addition to the impact force generated, you will need to apply an upward line pull. The maximum pull that can be applied to the Zenith 20 is 10 tonnes and the Zenith 80 is 20 tonnes. Note that when a shock absorbing spring is used this governs the maximum pull, as it will become fully compressed at around 8 tonnes. Keep a close eye on the compression of the spring, if at any time it nears full compression, reduce the line pull. Never operate the extractor loose, as the grip pins, and jaw pins will be allowed to vibrate and will break. These are classed as consumable items.

This type of extractor works more through persistence than power, and therefore you may need to work a panel of sheets, spending 3-5 minutes per sheet. Acting on alternate sheets on a panel has the greatest effect, as does starting with the last pile driven. NEVER spend longer than 5 minutes on a specific pile that has refused to work, work the panel.

Remember, the hardest part of extraction process is the initial movement, which then gets progressively easier.

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Structural maintenance and wear locations








Ensure all bolts are hammer tight and that threads and nuts are not damaged and in good condition.








Keep the sliding faces of the gripping dies and jaw grip clean and bright. Heavy and continuous working will wear the ribbed faces of the dies: this is a normal process and cannot be avoided. When the dies become worn they must be replaced or re-welded for efficient working.

Watch for wear on the side link bushes, the crosshead, the grip and the grip pin. Uneven wear in these parts will eventually lead to failure and worn parts should therefore receive attention in good time.

As this type of extractor has a self valving piston, it is possible that when delivered the piston is slightly out of its start position. Therefore, if as delivered the hammer refuses to operate a jerk or bump will free it and allow it to fall to the starting position.

Operating Procedures

-  Before setting the extractor to work, attach a length of rope to the saddle assembly (zeniths only) This will be used later. Check that you have the correct size of compressor a 250 cfm is required for the Tractomat IV and Zenith 20, whilst the Zenith 80 requires a 600 cfm. Anything less will not operate the extractor fully, and whilst the extractor may appear to be operating you will not produce much force.
-  Check that the air is clean and dry, and that suitable drain cocks are provided and fitted to release any condensate produced. Blow the hose out before attaching it to the compressor, be careful as air hose can whip, and so this should be done at low flow to reduce the chances of injury. To assist in this always store the hoses away from dirt, and never allow dirt to ingress to begin with.
-  Have you put oil in the lubricator? Prior to the hire, the extractor will have been serviced and tested, and hence some lubricant will still be present. This does not indicate that the extractor has been delivered with enough oil for the purpose of your application, nor that we have provided insufficient oil. We do not provide oil, that is for you to source.
-  Minimise the hose length to be used, the longer the hose, the greater the air pressure drop, and also the greater the chance of water condensation.
-  Check that the extractor grip dies move freely, apply grease (Zeniths) or oil (Tractomat) to the rear faces, never the front as this will prevent the sheet from being gripped. Use a wire brush to remove any soil or debris from the dies so that they have a clean surface. Also wire brush the top of the pile to ensure that the surface is free from oil, or grease or debris. Damaged pile tops should be cut off to enable the extractor to attach to the sheet.
-  Run the extractor slowly to begin with the gauge the speed of extraction, you have control over this by controlling the air supply at the compressor. Do not exceed the maximum speed of the extractor, to avoid this use the correct compressor size and control the flow.
-  If after removal of the extractor, a pile jams in its interlocks, never re-attach the extractor and operate at full power, since the pile and extractor could literally fly out of the ground. On one site where this was attempted the extractor and the pile shot into the air, and then on its descent jerked on the crane line releasing the pile. The pile subsequently came crashing through the cab of the crane. Fortunately, no-one was hurt in this incident, but you must be careful at all times.

-  When attaching the extractor to the top of the pile, it is always advisable to attach a secondary chain from the lifting gear to the sheet. This acts as a safety line to the pile, should any of the extractor components break.
-  Lower the extractor onto the pile, enabling the wedges to fit either side. Engage the grips through pushing the saddle assembly upwards (away from the pile) and start increasing the line pull (Zenith Extractors). For the Tractomat use the fork accessory to lever the dies down, as previously stated.. Always ensure that the full width and depth of the wedge makes contact with the sheet. NEVER only half grip the sheet as this will lead to the wedges becoming damaged.
-  In both cases the self tightening friction grips will only grip the piles if a constant pull is applied. Do not jerk the extractor as this shock load could damage the extractor, and definitely weaken the grip.
-  Once the grip is successfully engaged, keep personnel away from the extractor and never underneath a pile once extracted.
-  As with air powered impact hammers these extractors require oil lubrication, hydraulic oil should be used with the Tractomat and engine oil for the Zeniths. The use of anti-freeze in cole weather is also advisable.
-  If the sheet refuses to move after 3 minutes, then disconnect and try a different pile.
-  Once the pile has been extracted, but whilst there is still some reaction, the extractor should be disconnected, attach a rope to the saddle assembly (ahead of the extraction) to enable you to remotely pull down upon the saddle to help release the pile. The sequence of disconnection is as follows: Allow the extractor to loosen (stop pulling), disconnect the the air supply (prevents accidental start-up, pull down on the saddle assembly (Zeniths). In the case of the tractomat, the spring loaded grips should disengage once the pull is reduced, if not use the fork accessory to lever the grips upward. If neither approach works, as the grip is so strong, then 'drop' the extractor down in a controlled but sharp manner, ensuring all operatives are aware that this is about to happen. The grips should then release, if not then the application of direct force is only permitted using a rubber maul or mallet, never a metal hammer as this will damage the grip dies

**Should you have any questions or concerns,
contact APE on 01543 277680.**



**Additional technical information is available on our website
www.miniape.com or alternative get a copy of the STIG Safety in
Shoring Publication from the CPA.**