

Health and Safety Information

HSI 49

Vacuum Excavation



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Introduction

This HSI describes the range of hazards associated with vacuum excavation and any unexpected eventualities arising from failures. It is intended to provide guidance in support of the Essential Standards 1: Excavations and HSG47: Safe Digging Practices

Information within this HSI has been extracted from the Suction and Vacuum Excavation best practice group and its guidance, which is endorsed by the HSE. It follows a sensible and proportionate approach to managing health and safety.

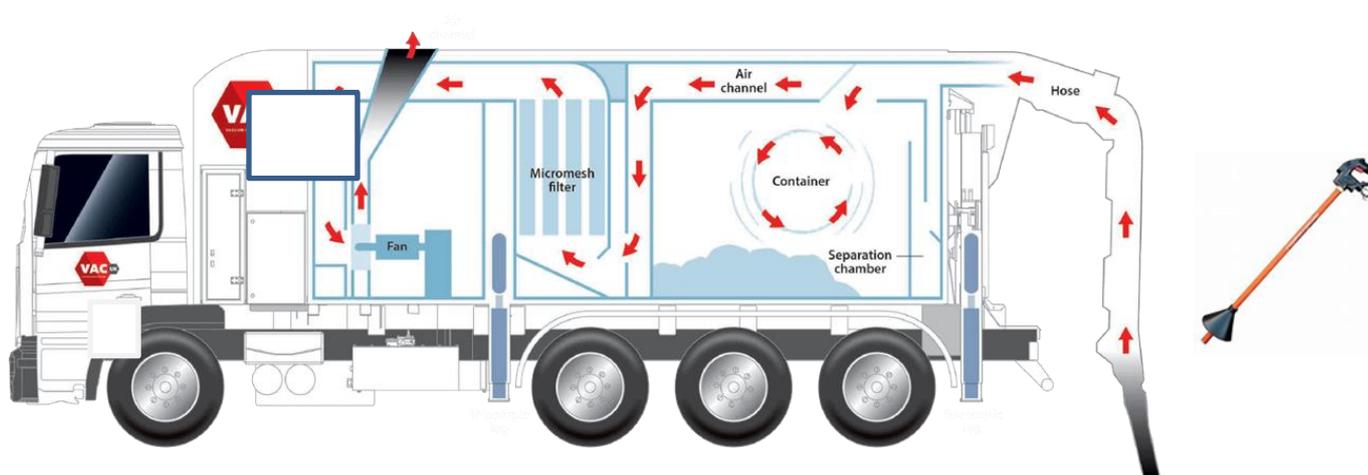
[HSI 49a Vacuum Excavation Pre-Start Checklist](#) which accompanies this document, is available for use on sites where vacuum excavation is to be used.

Note – This document must not be used as a design standard and designers must refer to the relevant Health and Safety guidance and applicable Essential Standards.

Definitions

Vacuum excavation uses a high-power blast of air via a lance in order to loosen soil and break up any large materials. An air vacuum hose is then passed into the site and used to suck up the loosened materials out of the hole and into a specially designed tank, ready to be transported elsewhere or saved for refilling the site later. Vacuum excavation is one of the safest methods of digging around live utilities as it allows you to remove the earth from around existing pipes and cables without damaging the underground utilities and causing any unnecessary health and safety or environmental incidents. Instead of physical work with shovel and air hand tools, both of which can damage underground cables or the risky use of an excavator, the soil particles, liquids, and sludges are simply suctioned away with the suction excavator.

Diagram for example purposes only



Examples where Suction / vacuum excavation can be used:

- Trial holes
- Tunnel and aquifers cleaning
- Shaft & pipeline
- Installing of new assets
- Trenching
- Waste transfer & disposal
- Building renovation and projects
- Tree root protection

There will be times where suction / vacuum excavation is not appropriate – please see “health and safety considerations” to determine this.

The Principal Contractor Sub- contractor considerations

- When proposing to use a suction / vacuum excavation technique, consideration **MUST** be given to the specialist, specification, planning and Health and Safety.
- The Principal Contractor / Control of Premises / Deputy Control of Premises are to assess the capability of any specialist sub-contractor to undertake suction / vacuum excavation. An assessment **MUST** be carried out to determine that they have the capabilities and experience to undertake the required task.

Training and Competence

- All personnel making up the vacuum excavation team **MUST** be suitably and sufficiently trained and competent to undertake the task. All vacuum excavation personnel should be fully trained to inspect the equipment required to perform each task.
- All personnel making up the vacuum excavation team **MUST** be suitably and sufficiently trained and competent to undertake the safe use of an air lance.
- The suction / excavator operator should always be able to show proof of training to the Client and site management.
- In addition to the specific training for vacuum excavation and air lance training, the operatives will also be required to have all of the other mandatory training for working with Thames Water.

Design considerations / Planning considerations

- Prior to committing to vacuum excavation, it should be documented why and what other methods were considered.
- Ensure the appropriate authorities, external parties and third parties have been engaged and written confirmation has been received.
- The suction/vacuum excavator owner / company to supply specific (safe system of work) related to the area / site of work, information to the client, that details the safe operating procedures and specific risks in suction / vacuum excavation operation / work in hand, so that an assessment around safe operation can be devised or incorporated into the clients site risk assessment and method statements for the work in question.
- Geotechnical investigations and surveys must be undertaken to identify ground conditions, specifically poor or difficult ground and where necessary unexploded ordinance survey conducted. Contingency planning must be relevant to the task and ground conditions on site. Proximity to other buildings, utilities and services must be considered to ensure minimal risk of service strikes and undermining.
- Recording of all services, statutory plans, and surveys must be kept and decision making appropriately and recorded in the Health & Safety file.
- Permits must be provided and issued for all activities that break ground as per Essential Standard 1: Excavations.
- All fluids used or produced from the operation / work task must be taken into consideration at the planning stage to any environmental impact for the work to be undertaken.
- If there are any live services or medium or high-risk activity, an emergency rescue plan must be developed and briefed to all teams.
- The route to the site of operations must be clear and free from obstacles. The area must have safe access and the site setup must be suitable and sufficient, including all exclusion zones controls related to practical disruption, noise and people plant interface, be it on site or offsite. Suction / vacuum excavation operator to ensure the vehicle is positioned safely and secured.
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Health and safety considerations

- The area must have safe access and the site setup **MUST** be suitable and sufficient.
- Reliable communications must be in place between suction/vacuum excavator operator and guidance operator.
- All excavations must be undertaken appropriately and in accordance with Essential Standard 1: Excavations and HSG47.
- Suction / vacuum operators **MUST** rescan the area to be excavated before work starts; even if the area has already been scanned and mark up.
- Fluids and particle collection **MUST** be considered as part of plan including on-going collection methods and suitable access and egress to the excavation **MUST** be in place.

- Remote controlled units MUST be isolated when not being used. This includes when fitting, repositioning or removing the unit when worn on the body so as to prevent inadvertent operation.
- Sufficient fresh air is needed around the operations to maintain a safe working environment. This could include exhaust fumes when the machine is operating and taking account of any additional contamination – including any volatile contamination and gases from disturbed ground that could evaporate once exposed to air.
- Suction/vacuum excavators should not be taken into or operated in a confined space unless a rigorous assessment and use of suitable control measures shows that the risk of incident is low.
- Securing devices MUST be fitted to all suction hose couplings and ground-engaging tools pipework to prevent them from fully detaching unintentionally. (whip-cords)
- On first arrival at a site, the suction/vacuum excavator operator should be inducted / briefed about management arrangements and MUST comply with these.
- The large movement of air caused by the suction of the hose may cause some depletion of clean air in an enclosed area such as a trench, tunnel or chamber and may in certain circumstances, causes breathing difficulties.
- Appropriate PPE and RPE for the operation / task; in conjunction with and as a minimum requirement according to Essential Standard 24 (Personal Protective Equipment).
- Overhead cables MUST be considered when setting up the machine; the boom must never be positioned where it might touch overhead cables or where electricity might arc to the boom or other parts of the machine. A safe method of working in the vicinity of Overhead cables MUST be included in the overall safe system of work.

Suction/Vacuum Equipment and assorted Equipment

- The suction / vacuum rig must be appropriate to the work in hand. Operatives MUST be able to clearly understand the working pressure and functionalities of all equipment.
- Sufficient air and forced ventilation to maintain a flow of clean replacement air must be maintained during works.

Personnel / Supervision

- When specialist sub-contractor is undertaking suction / vacuum excavation it should always be undertaken by a two-person team.
- No lone working permitted at any time when undertaken suction / vacuum excavation.
- The activity MUST always have adequate supervision during the entirety activity.
- Clients / managers / supervisor MUST have knowledge of the operation in hand and knowledge of suction / vacuum excavation technique. All supervisors, supervising the work must have specific Construction Skills Certification Scheme / Construction Plant Competence Scheme A78 related to vacuum excavation.
- Audit & Inspections should be complete by Site Managers, Principal Contractor / Control of Premises / Deputy Control of Premises as work develops to verified safe operating procedures are being followed.

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