

Suction Excavators Prove Very Successful in the UK

Introduction

The mini excavator market has grown as contractors prefer the maneuverability, low ground pressure and running costs of these units. However, accidental strikes on utilities continue to interrupt essential services, as well as financial penalties in damages, serious injuries, and in some cases, fatalities. As utility envelopes become more crowded, preventing damage to utilities has become increasingly challenging.

Suction excavation is changing all that. Suction Excavators use high-pressure water or air to quickly dig, precisely-controlled holes to uncover buried utilities. This is done by "keyhole excavation" using suction to physically uncover lines and cables to confirm its exact location. 'Keyhole excavation' is becoming a practice on a growing number of construction sites.

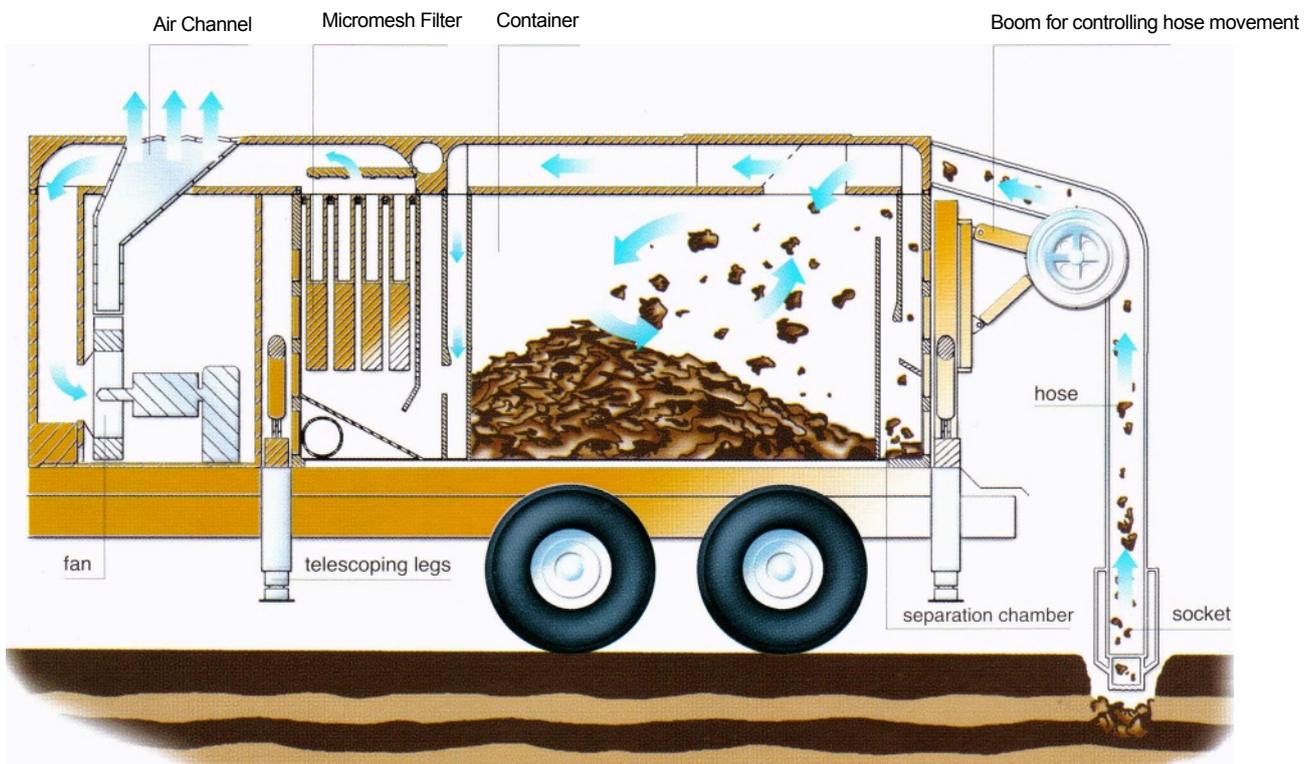
To enhance the performance, capability and safety, there is a potential opportunity to use suction technology for a number of activities.

It is envisaged that suction technology will maximize productivity through keyhole excavations to help reduce the risk of utility strikes. Suction excavation can also reduce the size of the excavations to minimize waste removal and its associated disposal costs

Principles of Suction Excavation

The current operation to undertake excavations is to use mechanical digging equipment i.e. mini excavators, backhoes. However, with the ongoing increase in the number of buried utilities (gas, water, telecommunications, optic fiber and drainage) suction excavation is a growing alternative.

DIAGRAM OF SUCTION EXCAVATOR



How it works - A description

An air flow volume of up to 32,000 m³/h (32,700 cu.yds./hour) is generated by a radial fan, creating a vacuum of up to 40,000 Pa (5.84 psi) of head. The suction hose is moved three-dimensionally via a hydraulically operated boom. The material is sucked up through the intake nozzle. All kinds of material, up to 250 mm (9.84") in diameter, can be removed. In the tank the air flow is quietened and reversed. As a result, the main elements are eliminated from the air flow. The air current is now flowing through separation chamber. In this way, the air is purified and dried.

The tank is located in a position that ensures optimum axle weight characteristics of the vehicle. The remaining dust particles are trapped in the micro-mesh filter. The purified air is discharged to the top over a large surface area. The fine filter system is cleaned by means of air pressure. During the tipping phase, the tank, the separation chambers and the fine filter unit are emptied. The central operating console, or a remote control box connected by cable, or a radio-operated remote control box (optional feature) permit all operating functions to be performed.

Technical data

Length approx.	8.60 m
Width	2.50 m
Height approx.	3.40 m
Maximum Suction Depth	20m*
Maximum Suction Span	100m*
Fan	25,000 -32,000 m ³ /h
Vacuum	17,000-40,000 Pa
Compressor	3.0 - 4.5 mVmin; 7 bar
Tank Volume	7-8 m ³
Telescope-Boom	with radius up to 5.30 m

Transport Vehicle

- Overall weight at least 26 t
- Motor power at least 310 PS
- Wheelbase at least 4,200 mm
- Power take-off for the fan
- Power take-off for the hydraulics

* depending on the nature of the material removed and the optional equipment

Conventional repair methods often require large "open" excavations, followed by the removal and disposal of unwanted soils. Jobs are typically performed using several pieces of equipment: mini excavators & trailer, pavement breakers, safety barriers, backfill material, unsightly waste at side of excavation. Excavations can also be a major cause of traffic disruption, and in some areas some council's have limitations on time frames when utilities can be excavated.

Suction excavation systems help create a reduced excavation and removing soil via suction into a debris tank, therefore removing unsightly waste at the side of the road. The system can help reduce the amount of equipment used to undertake the activity, such as mini excavator and separate waste removal vehicle (s).

While operations can realise significant savings using keyhole technologies, client / consumer also benefit through less disruption and noise, quicker repair times, fewer and shorter service interruptions, and reduced traffic inconveniences.

Key Benefits

1. Reduced utility strikes - No evidence of service strikes using Suction Excavation in other countries.
2. Reduced size of excavations - minimised waste costs
3. Compacted clays can be excavated.
4. No spoil on site - less traffic disruption
5. Improved access over Grabs as no side capture problems.
6. Good excavation output.

In today's climate, Suction Excavators offer a safer way to work underground, being non aggressive and non invasive. The onboard tools used in conjunction with the vehicle ensure that all apparatus can be exposed safely and cleaned out on all sides without any problems.

Findings

Where work is done from above ground through a smaller suction excavation, it can easily increase productivity compared with mechanical methods, and is far safer as well. Finally, small excavations made by the suction excavation are easier and less expensive to fill and repair than the larger ones made by mechanical equipment.

Advantages of Suction Excavation over Mini Excavators and Hand Digging:

- Rapid response - could be undertaken without utility plans and / or cat scanning in emergencies.
- Even with hand tools it's easy to damage a buried utility and, of course, backhoes are at risk at causing utility strikes.
- Excavations created by a suction excavator can be faster and easier to patch than the much larger hole left by mini excavators or by hand digging.
- Suction excavation is much faster than hand digging.

There are significant additional hidden cost benefits resulting from the use of suction excavation technology.

These can be summarised as follows:

- Minimise cable and services strikes
- Significant mitigation of risk associated with consequential costs levied against the business.
- Reduced quantities of spoil and waste and hence reduced disposal cost.
- Much increased efficient use of the Work Gangs resulting from the reduced need to repair unforeseen services disruption, hence more time to work on the core activity which ultimately leads to greater capacity.
- Reduction in Plant and transport logistics, as the work gangs switch from traditional methods to suction extraction. Subsequent reduction in logistics cost base.

SUCTION EXCAVATOR ESE26



New, internationally patented functional principles guarantee consistently high suction performance and low maintenance.

- Almost no filter pollution
- Highly efficient filter cleaning system
- Optimum distribution of weight
- Easy-to-service, robust equipment
- Low machine height
- User-friendly control system
- Reduced knock-on effects on the environment

Manual excavation

1 Manual excavation, normal soil conditions, presence of buried cables and pipes

Employing Suction Excavator for removing

2 Heavy soil, presence of buried cables and pipes

3 Dry and heavy soil

4 Wet and heavy soil or clay

5 Moderately heavy soil, presence of buried cables and pipes

6 Muddy soil, gravel and crushed rock

7 Sandy soil

8 Water

