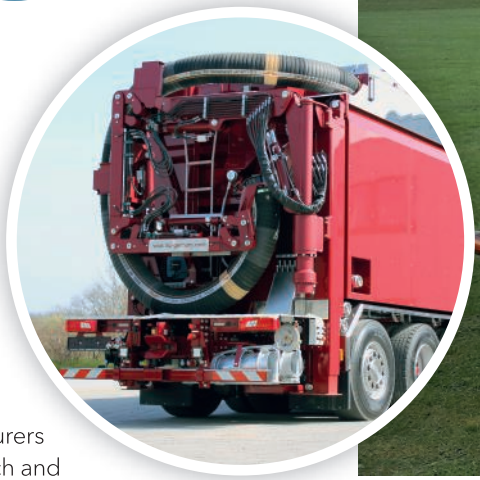
THE HOLE TRUTH



For a cleaner, more efficient digging process, many operators are now turning to vacuum excavators. John Challen looks into the development and the operation of these machines

Utility companies often get a bad press for causing disruption to drivers, pedestrians and other road users. Lane closures, temporary traffic lights and delays occur when they need to dig up pipes or cables underground.

To limit this disruption under the surface, manual labour is not an option, so it's down to specialised machines to do all of the hard work. In the past, the machines that have dug trenches have moved soil and hardcore into a waiting skip or vehicle, but times have changed – and the process is now much slicker.

Suction excavators – employed when repair, cleaning or maintenance work is required – claim to be more than 16 times more effective than conventional excavation methods. The machines – which deploy a jet of pressurised air or water to loosen the soil, and then hoover it up – typically require one operator instead of three to do the work.

One of the major players in the vacuum excavation market is RSP (pictured, inset) which originated in Germany in 1993 and came to the UK 10 years later. Another prominent manufacturer is MTS, represented by MTS Suction Systems UK (main picture), or US manufacturers Ditch Witch and Vac-Tron.

Nigel Gardener, RSP UK's customer support manager, says that the vacuum excavator market is growing steadily, having evolved and matured over a relatively short space of time. "When we started in the UK, most people were buying 6x4 tractor units, but as time has moved on, in the past two and a half years we've started selling more tridem chassis. That configuration better suits the application of suction excavators, because you've got the carrying capacity right where you need it, under the container at the back of the vehicle. They are also good value for money."

Gardener says that RSP can essentially fit the kit to any chassis on the market, but has a preference for Mercedes-Benz and MAN. Typical chassis sizes fitted would be a 32t gvw four-axle construction chassis or 16t gvw two-axle distribution chassis, but there are smaller units available. Mobile devices can be detached from a vehicle and deployed at sites and used as a standalone product. Some rental firms offer suction units mounted on trailers (see box).

He adds: "The smallest mounted unit we currently offer is a two-axle machine on an 18-tonner. We've done some city suckers mounted to 12-tonne DAFs in the past for National Grid, one with a coring unit and the other with a vacuum part, but that was rare. They wanted a truck that would perform the suction and also carry the quarry unit, because they were using two trucks and four engines. Now they have one vehicle that does the job. This kind of unit is very popular in big cities as it is much more efficient in terms of time and money."

DOING THE DIRTY WORK

The biggest – arguably in terms of both size and importance – component of a vacuum excavator is the fan, and RSP sources these from a single manufacturer in Germany. Suction units can be specified with a single, double, triple or quadruple fan, but Gardener says the double is the most popular. "The triple and quad are typically used for sucking over longer distances," he explains. "Most operators and utility companies in the UK are happy with a double-fan configuration, which can

HIRE AND HIRE

Nigel Gardener estimates there to be around 450 vacuum excavation machines in the UK market – with more than 200 of these sourced through RSP. On top of that, there is a growing hire market. "A lot of people pick up the work, but it's not enough work to make it cost effective to invest in a machine. So they will talk to hire companies, who can also supplier a driver/operator with the package," says Gardener.

PSS Hire, for example, offers the iVac, a 1.6m-wide track-mounted suction excavator designed to be transported on a standard plant trailer. The iVac specialises in excavation in areas of limited access. It features a 250mm-diameter hose, suction depth to 5m, and can discharge into a 1t bag.

suck materials over a distance of 30m and down to a depth of 20m. That is more than sufficient for that operation." The DV (double ventilator) double fan has an airflow rate of 42,000m² an hour, coupled with a negative pressure of 40kPa. "Realistically, that set-up will suck down to depths of 30m – for comparison, water and gas mains are typically around 1m-1.3m maximum," explains Gardener. He adds that one of RSP's biggest customers is Cadent (formerly National Grid Gas Distribution), which has nearly 60 vacuum excavation trucks, a mixture of single- and double-fan configuration.

"Some of the products sold to Cadent use a single high-speed fan because the operators are working in close proximity at the back of the vehicle. However, for the double-fan machine, they might be working further afield, and we need a minimum of 440bhp to power them."

The customer support manager went on to discuss powertrain. He adds: "Our preferred method of powering the fans is an engine-driven PTO, as opposed to a gearbox PTO. However, we do use these for movements such as tilting the container for tipping, or dropping the stabilisers."

RSP retains responsibility for maintenance. The first service interval is after 100 hours of use, and includes basic tasks such as changing the filters in the hydraulic system. After that initial inspection, the trucks require servicing every 500 hours.

Due to the time-sensitive nature of the work, a lot of the servicing is done at the operator's location by travelling engineers. Explains Gardener: "Because of the cost of these machines and the need to fix problems quickly, a lot of the time, people want us out there with them as soon as we can get there." There is, of course, also the option to travel to RSP's HQ in Roxton, Bedfordshire.

As well as fans, the other key ingredient of the operation is the suction hose, the maintenance of which can vary greatly depending on the application. "The hoses are pretty self-cleaning, because if you've got clay and boulders going up them, the stones will clean them as you are working," he states. "Life expectancy can be anything from a few months to years, but we did have a truck in recently from Scottish Gas Networks that was supplied in 2012 and still running the original hoses."

At the other end of the spectrum, those operators sucking up concrete can expect hoses to only last a few months before they are damaged. "I would say the average life expectancy for the hoses would be 12 months – you can always tell an owner-operator because they really look after their hoses," Gardener points out.

The future looks bright for vacuum excavators. Gardener argues that new avenues are being explored. "The market is still in its infancy, and is increasing every year. It is also now not just the utility companies: the likes of Balfour Beatty are using the equipment on a lot of civil jobs, and we know for a fact there are a lot of machines in Sellafield and Hinkley Point." In addition to working on rather exotic nuclear clean-up and construction sites, these trucks are also likely to become ever more common on municipal jobs around the UK. TE