

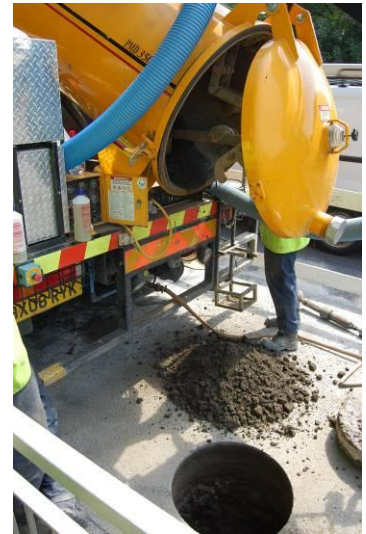
'Core & Vac' - a technique to reduce congestion

The Mayor of London and Transport for London (TfL) propose to implement a targeted Lane Rental scheme that will allow TfL to charge companies a daily fee for undertaking roadworks on London's busiest roads at the busiest times. The Lane Rental scheme will help incentivise more efficient working practices and reduce disruption from roadworks, which it is estimated costs the Capital's economy around £750 million a year. Around £300 million of this is on the Transport for London Road Network (TLRN) or on Red Routes.

To help to minimise the amount of time that works disrupt traffic, either by ensuring works are carried out as speedily as possible, or by ensuring that more works are carried out outside of peak traffic hours, there is need to encourage the highway construction industry to deliver a real step change in the way that roadworks are planned and carried out.

This is the first of a series of 'Quick Win Innovation to Reduce Congestion' (QWIRC) Notes, produced on behalf of TfL and the DfT, and aimed at providing roadworks contractors, utility companies, highway authorities and equipment suppliers with information on how to employ innovative technologies and methods to reduce the impact of road works on traffic congestion.

QWIRC1 covers the use of 'Core and Vac' to reduce the number and size of excavations required to undertake work on underground apparatus. This Note has been prepared jointly by TRL Limited and National Grid.



What is 'Core & Vac'

'Core & Vac' involves gaining access to utility company apparatus by drilling a hole into the road, removing a core of bound road material and then removing any unbound material using vacuum extraction. After completing the works, the unbound material and the core are then replaced to provide a surface that is flush with the rest of the road. It is a technique that has the potential to significantly reduce congestion caused by roadworks – the technique could be considered as 'key hole surgery' of roadworks.

Specialist equipment is required for 'Core and Vac', and the technique consists of five basic operations:

Stage 1:

Coring through the bound layers to remove a core of up to 600mm diameter





Stage 2:

Vacuuming out the unbound material, after loosening as necessary

Stage 3:

Undertaking the repair from the surface using specialist tools



Stage 4:

Reinstating the unbound material in layers, checking the compaction with a peizo sensor and a compaction monitor.

Stage 5:

Grouting the core back in place to achieve the original surface level.



Utility maintenance

The technique was originally developed for the gas industry in the USA and is now becoming increasingly used in the Gas and Water industries in the UK. These industries have developed specialist tools for working on the apparatus below the road surface. It could, however, offer benefits to other utilities if the right tool kits are developed to enable maintenance to be undertaken from the surface. Example tools are shown below.



Hand-held pole tamper



Long-handled Stilsons

Keyhole maintenance without 'Core & Vac'

Although the equipment for keyhole maintenance has generally been designed for use with the 'Core & Vac' technique, there is no reason why it cannot be used for work on other narrow openings, however formed. The advantages to be gained will include a reduced number and size of excavations, but the final reinstatement will not necessarily match the existing surface as closely as simply replacing what was already there.

Benefits

Reduced Traffic disruption

National Grid has found that when using 'Core and Vac' the duration of their works are typically reduced from 5 days to 1/2 a day. The coring and reinstatement stages can be carried out separately or together. The whole operation will, therefore, be completed in much less time than a larger, conventional excavation. There are also the additional advantages of:

- the width of any road closure will generally be reduced, even allowing for the truck-mounted 'Core and Vac' equipment; and
- the contractor is able to leave the site in a relatively short time if circumstances change requiring the road to be reopened as soon as possible.

National Grid has estimated that, between January 2009 and September 2011, the use of 'Core & Vac' has reduced delays to the travelling public by 253 days.



'Core & Vac' operation

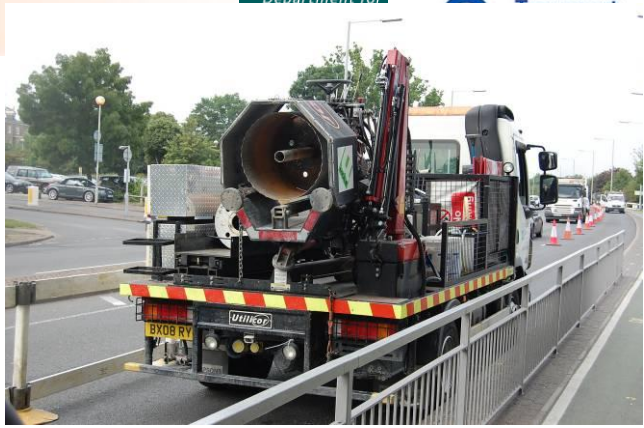
Less material excavated

The excavation size required using 'Core & Vac' is only about 20 % of that needed by traditional methods. The amount of excavated material and imported fill, with the associated lorry movements, would therefore be reduced by 80% compared to conventional excavations. National Grid has estimated that 'Core and Vac' has reduced the excavation and reinstatement

materials by some 350 tonnes in London. Nationally (including London) the amount of excavation and reinstatement materials with 'Core & Vac' is estimated to have been reduced by 1,845 tonnes.

Less pavement damage

The traditional rectangular excavation will affect a larger area of the road and can weaken the surrounding pavement because of structural stresses at the corners and difficulties in compacting materials. A circular excavation has less of an impact on the surrounding road and is easier to compact.



Improved reinstatement and surface finish

The final reinstatement consists primarily of the material that was there before any work was carried out; the exception being the bonding compound around the circumference and at the centre of the core. In addition, by marking the road before taking the core, the 'directionality' of the surface material can be retained. The reinstatement will be more robust than some conventional backfills, and its skid resistance and appearance will be identical to that of the surrounding road. After a short period of trafficking, the repair will have blended with the rest of the road.



Completed reinstatement



Reinstatement after 2.5 years

Further information

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October 2011