



New technology for drain assessment

The challenge

The assessment of drainage systems presents a significant challenge. Visual assessments are difficult to carry out and the outcomes are less reliable because the majority of the components cannot be viewed by an external assessor. A manual assessment can only determine if a drain is blocked at the location of the manhole or gully. Current technologies to identify blockages within the pipes themselves utilise expensive and slow survey techniques such as CCTV, in which the drain is firstly jetted, then a CCTV camera is introduced and travels along the pipe to identify blockages. This is reliable, but extremely slow and expensive. An alternative inspection method which would be quick, cheap and reliable is required.

The technology

TRL has developed a new technology for drainage assessment based on the use of acoustic techniques. The system incorporates a speaker and microphone (Figure 1) introduced at a manhole and lowered to the pipe opening. An acoustic wave is produced and the reflected acoustic waves picked up by the microphone. The received signal is analysed using a bespoke algorithm to identify and locate blockages within the pipe.

The method has been demonstrated to work using a 300mm drainage system constructed within TRL's laboratory facilities. A larger scale test rig (200m long) with 450mm diameter pipes has been installed on TRL's test track to further test the system. This has shown that the equipment can provide information about the size of blockages within the pipe and determine their distance from the source of the input signal (i.e. their location along the pipe).

The drain assessment method has been trialled on pipe drains typically used on the trunk road network. Work is now ongoing to further ruggedize the system and plans are in place to carry out further trials on the road network. A patent has been applied for.



Figure 1: *Measurement System.*

The advantages

This new method is smarter and much more practical than CCTV and offers many advantages:

- In CCTV the camera must travel along the drain until a blockage is reached, which is a time consuming process. The acoustic method requires only a few minutes at each drain once access to the drain has been made.
- In contrast with CCTV, jetting should not be required (but the drain should not contain a large amount of water).
- There is very little risk of the equipment getting stuck in the drain (as can occur with CCTV) as the equipment must only be inserted into the pipe at the location of each manhole.
- The system offers the potential to characterise the drain for the purpose of trending. The characteristic measured in an initial survey can be compared with the data collected in later surveys to identify changes in the condition.

Further Information

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