

Thousands of people across the southern region of Tayside in Scotland will be drinking their tap water with renewed confidence this year thanks to a new pipe renovation system developed by Hunting Industrial Coatings.

The Company has successfully achieved approval from the Drinking Water Inspectorate for the use of its *Waterline* epoxy lining system, and has already seen its product installed into more than 30 kilometres of water main. The material is a specialised epoxy resin which can be sprayed on the inside of corroded pipelines.

The water mains of Britain, many of which were laid in Victorian times are, in a number of places, suffering from an acute build-up of rust or limescale - to such an extent that it is not uncommon to discover pipes to be under a quarter of their original diameter. Rust tuberculation tends to occur in soft water areas, due to acidity, while limescale predominates in the hard water areas. The problem is frequently compounded with the two building up together. The result is reduced water flow, discolouration and contamination.

Water companies across the country are planning and investing in extensive rehabilitation and replacement programmes, and in many cases have set their sights on epoxy lining as a viable remedy. There are a number of obvious points in its favour: it reduces the internal diameter of the pipe by less than other lining methods, it is durable, resistant to corrosion, and the water main can be brought back into service very rapidly.

The future for the system, according to HIC's general manager, Neil Whittle, looks positive: 'Everybody has worked extremely hard to get this far, and we've passed the tests with flying colours. There's a lot of interest in epoxy because of its advantages over cement lining and bitumen coating. We can install the lining in lengths up to 150 metres, which means there's only a minimum of interference to traffic and people'.

#### Research

Working with HIC throughout the research and development programme, which is estimated to have cost in the region of half a million pounds, has been AMEC Utilities, a member of AMEC plc, the international engineering, construction and development group. Under the joint venture arrangement, AMEC Utilities carries out the installation of the in-situ lining for potable water mains. The company has invested in its own custom-designed



Pipe cleaning before resin application.

plant and equipment and now has some of the most advanced technology available.

The first Hunting/AMEC trials took place in 1990 in West Sussex, but it was not until 1993, following final taste and odour tests, that approval was given to use Hunting *Waterline*. The two companies quickly took the new lining system out to the market and within a few months had won the Tayside contract, valued at £400,000, in competition with four other companies. The contract is now drawing to a close, and a number of towns such as Perth, Dundee and Forfar are now in possession of what is in effect a new mains system.

AMEC Utilities discovered that much of the pipe infrastructure in Tayside was indeed in great need of renovation.

In some areas, the build-up

in the mains was so great that a gap only 20 mm in diameter was left.

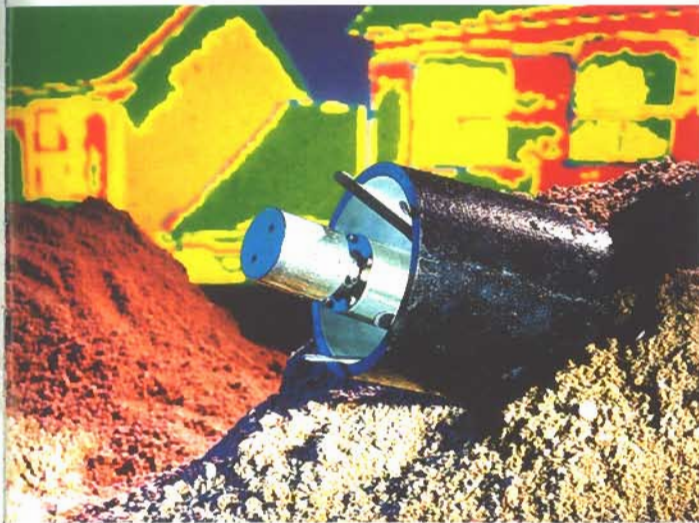
Having shut down the water supply, the first job is to clear the pipe. To do this, a revolving metal flail is pushed by rack feed through the main, breaking down the scale, which varies in consistency, according to the region, from a soft crust to a concrete-hard deposit. The debris is washed out of the system using water. Soft, foam 'pigs' are then air-propelled through the pipe until all the remaining water and sediment have been cleared.

First *Waterline* contract

*Waterline* epoxy resin is supplied to the applicator head through the two pipes from this trailer.



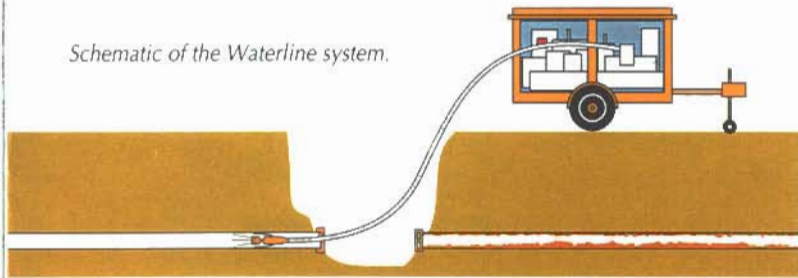
Applicator head in situ.



Waterline - the ultimate cure for corroded potable water pipes and tanks.



Schematic of the Waterline system.



*is successfully completed*

### Epoxy lining

After inspection by closed circuit television, the epoxy lining is applied. The heart of AMEC's new application system is basically a trailer-mounted storage, measuring and pumping unit. A winch on the front end pulls back a spray head, which is attached to the component and compressed-air hoses. The head is mounted on four adjustable skids to keep it central in the main undergoing treatment. As it is pulled through, pumps on board the trailer send resin and a hardener down separate hoses, through a mixer unit, to the spray head. The result is an even layer of resin, usually about 1 mm thick (dependent on clients' specifications) all over the internal wall. To ensure consistency throughout all of these operations, an on-board computer monitors the activity. The resin cures within 16 hours, which is the industry standard and, generally

### Water tanks

In a further recent development, the Hunting/AMEC joint venture has received the go-ahead from the Drinking Water Inspectorate to apply the lining, in-situ, in water tanks. Neil Whittle: 'This is obviously good news; bulk retaining tanks suffer from corrosion in the same way pipes do. We estimate, and these are conserv-



ative figures, that the potential market value is somewhere in the region of £50 million - just for tanks.'

Secured contracts for the joint venture include the lining of 2,000 sq. metres surface area (S/A) of concrete filter vessels for Welsh Water in Anglesey; a 2,000 sq. metre S/A Braithwaite tank in Cardiff, also for Welsh Water; and three storage tanks in Suffolk for Suffolk Water.

'We're delighted to have won this work so quickly', says Whittle, 'We're hoping that in addition to the smaller end of the market, which can be as small as 30 sq. metres S/A, we'll soon be working on the big underground reservoirs, which have surface areas for coating of around 24,000 sq. metres. The signs throughout the UK are very good, and I'm sure Britain is not the only country with pipes and tanks in need of attention.' ■

The Waterline system has been used to line this storage tank in