A challenging context

The use of trenchless technologies is increasingly gaining momentum in the local infrastructure arena, given the advantages in both efficiency and cost they offer. Chantelle Mattheus speaks to TT Innovations’ director, Neil van Rooyen, about the challenges faced in rolling out these technologies.

As with most infrastructure related projects, best practice on-site is always key, but this is undertaken in a challenging environment with many factors contributing to an increasingly complex context under which these projects are rolled out.

Infrastructure already in place on-site also provides its own challenges at times. “For pipeline rehabilitation projects, this does not pose too much of an issue as the existing plans and records are fairly accurate and are easily verifiable, either by conducting a camera survey of the existing pipeline (gaining access via the manholes) or for pressure networks by locating pipeline markers on the surface such as valves, hydrants or tees,” says Van Rooyen.

However, the latter is not an option for new trenchless installations by means of horizontal directional drilling or pipe ramming as-built records are crucial. “Any discrepancy could lead to the existing services being damaged during the installation process. As a best practice for new installations, all existing services are required to be positively identified (by verifying the depth and location) and superimposed onto a long section drawing where the proposed installation alignment has also been plotted.

“The local authorities that issue wayleave documents therefore play a critical role in this phase of the project by providing accurate wayleave documents. Any delays from these departments usually result in the entire project being delayed.”

Comprehensive planning process
When addressing the challenges relating to planning and the roll-out of these projects, Van Rooyen stresses that clients need to be able to make informed decisions regarding the assets under their control.

“This can only be done once comprehensive asset condition assessments are undertaken. Proper asset management and resource allocation should therefore be the main priority of decision-makers. Utilising the appropriate trenchless technology results in reduced overall costs and increased asset performance. Unfortunately, most of the ‘asset management’ work is undertaken on an urgent basis due to failing infrastructure,” he says.

He adds that by failing to forecast scheduled maintenance, project specifications are often hastily prepared. “This allows for a wide range of bid submissions to be accepted, which conforms in principle but not necessarily in performance – a further consequence of which is a disproportion between the contractors’ prices. This disproportion is generally indicative of varying product quality.”

He advocates pre-emptive planning strategies as being favourable for both contractors and clients as projects can be rolled out on a more consistent basis – making it easier to allocate funding and resources – as opposed to reactive planning, which only allows for crisis management.

Proper asset management and resource allocation should therefore be the main priority of decision makers.” Neil van Rooyen, TT Innovations director

Residual resistance
Despite the numerous advantages of the trenchless technologies available, there is still some resistance in the infrastructure environment. “Resistance to change is a common human tendency, which is also common to implementing new – often misunderstood – technology,” says Van Rooyen. He states that most clients have various misconceptions regarding trenchless technology; these are based predominantly on hearsay and perception.

These misconceptions include a belief that the technology is too expensive to implement in smaller rural municipalities and that the process is too mechanised, which results in ‘no’ local labour participation. “However, by using actual data collected from completed projects, both these misconceptions have been refuted,” Van Rooyen explains.

A further hindrance is the lack of trenchless construction specifications, which limits the client and engineers’ ability to administrate and evaluate trenchless projects. “Conventional construction is then chosen in favour of
trenchless technology, compounding the resistance to change,” he says.

Construction circumstance
These misconceptions aside, the practical challenges on-site are what ultimately impact delivering the project on time. “With proper project planning, mitigating measures and allowances can be made to deal with unforeseen site circumstances. An inherent challenge with trenchless technology is the fact that work is undertaken underground and out of sight. Underground obstructions and difficulties therefore do arise – which are largely beyond the contractors control. Unfortunately, many clients pass this risk onto the contractor, which inherently increases project’s cost (as contractors then make allowances for these risks in their pricing).”

According to Van Rooyen, a far more effective mechanism would be for clients to allocate contingency amounts to deal with these unforeseen occurrences.

Safety, on the other hand, is often a highlight on-site, with safety statistics often improved on a trenchless site versus a conventional open cut operation, predominantly due to the limited trenches. “The fact that work is undertaken underground and therefore out of sight can result in unallocated services being damaged, which might prove hazardous to work crews though,” warns Van Rooyen.

Education essential
Unfortunately, a lack of understanding regarding the trenchless technology processes and its implementation has another consequence, according to Van Rooyen. He says the reason for this is twofold: “First, role players utilise trenchless construction as a ‘miracle cure’ for all pipeline work, which is not always cost effective, and second, clients have unrealistic expectations regarding the capability of the applied trenchless methodology. Both viewpoints might lead to the entire process being viewed negatively.”

Van Rooyen notes that only in recent years has the technology been rolled out to tertiary and training institutions. “The promotion of trenchless technology is therefore intrinsic to educating clients and engineers – an ongoing process.”

The technical nature of most trenchless operations necessitates the use of dedicated staff for specific equipment operation, which also requires the appropriate training. “Incorrect operation of equipment, in particular for new installations (horizontal directional drilling, pipe ramming, etc.) could lead to damage of equipment, surrounding infrastructure and underground services.

“A project milestone approach that highlights certain project risks at different stages and allows for the necessary contingencies to be in place should be presented to the client. This co-accountability and open communication between client and contractor is essential to ensure project success and also largely reduces the risk both parties are exposed to,” he says.

Best practice by far
According to Van Rooyen, simply the use of trenchless technologies can be considered best practice in itself. “Trenchless technology offers an efficient construction means to install, upgrade and replace ageing underground infrastructure. With limited trenching required and a small site footprint, this form of ‘no-dig’ construction is hard to refute.”

This is reinforced by the fact that, for the same project outcome, trenchless construction requires far less resources than a comparative conventional open-cut operation.

“This leads to significant reductions in public inconvenience usually caused by construction activities, lower health and safety risks as long open trenches are avoided, and a lower carbon footprint as less construction plant and natural resources (filling sand and aggregate for reinstatement and road layer works) are utilised.”

With increased environmental awareness and the general public being less sympathetic to construction inconveniences, trenchless construction should therefore, according to Van Rooyen, be the first consideration when undertaking work in urban environments. Unfortunately for the majority of project awards, clients (largely mandated by procurement policies) award contracts based on price only. “More consideration needs to be given to the contractor’s performance record and the selected methodology’s ‘appropriateness’ in achieving the required project outcome. Stringent contractor evaluation, performance and accountability are crucial to ensure the sustainability of this fledgling sector,” he concludes.

---

**Turnkey DOSING projects**

- heavy and light duty -

- Pumps
- Mixers
- Aerators
- Instrumentation

---

ECOCHEM PUMPS

Precision pumps and mixing solutions

ECOCHEM PUMPS (Pty) Ltd, www.ecochempumps.co.za
email@ecochempumps.co.za, t: +27 11 455 5710, f: +27 11 455 5842
PO Box 7181 Primrose 1416, 3 Sun Rock Close, Germiston 1401