Trenchless Australasia

REGULARS
Chairman's Welcome 2
Secretary's Corner 4
Directory of Services 48
Upcoming Events 50
ASTT Corporate Members 50
About the ASTT 51
Membership Application 51
Advertisers' Index 52
Subscription and information request 52
Coming in future issues 52

NEWS
OzWater Conference 6
en .NZ 05 7
Trenchless Egypt 2005 8
Robbins appoints new MD 8

PIPE RELINING
World's largest Rotoloc sewer relining project 10
N. a Shore spiral wound contract a NZ first 11
Perma-Liner demonstrates CIP rehabilitation services 12
Kembla retains South East Water contract 13
Nu Flow completes major down pipe reline 14
InnaTube pipe relining from 'us' 15

ROOT CONTROL
Sewer root control with Sanafoam Vaporooter II 16

Technologies for sewer rehabilitation in Malaysia 19

UTILITY - GAS
Otway Gas Project - microtunnelling retraction project 22
Atteris breaks new ground in pipeline engineering 23

PIPE AND CONDUIT
Humes launch new jacking pipes 24

PROJECTS
Microtunnelling - an environmentally friendly solution 26
Multipipe installs conduit for CitiPower in Melbourne 29
SAD8: delivering projects on time and on budget 32
Harker Constructions Wellington contract 34
Orica groundwater remediation project 38
PSP established at Belimbla Park 40

PRODUCT SHOWCASE
JB Sales brings GeoRadar to SE Asian markets 42
'us' Alliance services customer needs 43
Underground Services take delivery of new Grundodrill 44
Drilling needs covered by HMI 47
Promotion of the 24th International NO-DIG 2006 Conference and Exhibition received a boost in May with the Conference flyer being distributed at the Australian Water Association’s OzWater Conference.

The OzWater Conference and Exhibition was held at the Brisbane Convention and Exhibition Centre, the same venue that we will be returning to for our prestigious event.

The second phase of local promotion will occur at the enviroNZ 05 Conference and Exhibition that will be held in Auckland in September.

Whilst participating as an exhibitor at the Brisbane Convention Centre it was pleasing to note that there is definitely adequate space for our exhibitors. I found both the sound levels and the overall lighting extremely good. The venue itself is first class and should not cause any problems.

Trenchless Asia 2006

In a future edition of our magazine, I will be providing details regarding participating in Trenchless Asia 2006 - Shanghai, which is taking place on March 7 - 9. The ASTT would like to facilitate an Aussie and Kiwi presence at this exhibition and for those that have participated in the past, you will know the sort of deals that the ASTT can provide exhibitors. I mention this now as it will give companies time to start thinking about developing business opportunities in China.

Directory of Services

Is the information about you or your company accurate on the ASTT website?

Almost on a daily basis I receive requests about the range of services our members can supply. Every time I receive these enquiries I forward the interested party to the ASTT Member Services website, where it is quite easy to search for the desired information.

To ensure that your information is accurate, I would request that every member review their profiles and advise me of any changes that you feel need to be made to make your site more relevant. If you are not sure of exactly what I am chasing, take a moment to review some of the other members with similar interests as yourself.

When supplying me with your revised information, I would also request you adopt the following headings so that there is no chance of misinterpretation.

Contact Details: Email and Website addresses; Type of Business; Business Profile; Areas of Interest; Equipment, and Main Area of Expertise.

Some of you have not taken up the offer of displaying your company logo so I would therefore encourage you to also send me this, preferably in a .gif format, so that it can be included on your web profile. To access this site, refer to the following link: www.astt.com.au/controls/frmSearch.asp

2005 Annual General Meeting

This year’s AGM will be held in conjunction with the NZWHA and ASTT Conference and Exhibition. It is anticipated that the AGM will be held around 5:00pm in one of the meeting rooms at the Aotea Centre. The tentative date is currently Thursday, September 29. Once confirmed, all members will be formally advised.

2005 - 2006 Council Nominations

In accordance with item 7c of the ASTT Constitution, the “Call for nominations to Council” will be sought from financial members this July. Financial members in each State and/or Country will be required to forward to the Federal Secretary by the designated date the name of the person they wish to nominate as Councillor to represent that State and/or Country for the forthcoming year. All nominations must be seconded by another financial member from the same State or Country and agreed to by the nominee. If more than one nomination is received for each State or Country, then the Federal Secretary will arrange postal elections for that State and/or Country.

Jeff Pace
ASTT Secretary

The Australasian Society for Trenchless Technology (ASTT)
ABN 43 893 870 966
18 Frinton Place
GREENWOOD, WA. 6024
www.astt.com.au
e-mail: jeffpace@astt.com.au
Technologies for sewer rehabilitation in Malaysia

The privatisation of the national sewerage system was a milestone in Malaysia’s efforts to safeguard the environment. Indah Water Konsortium Sdn Bhd (IWK) was awarded a 28-year concession agreement which comprises the takeover of sewerage services of 144 local authorities in the country. Under this concession, IWK is responsible for the upgrading, operation and maintenance of the existing sewerage system within the local authority areas.

The objectives of Indah Water’s Concession Agreement are to connect existing toilets and septic tanks to modern sewage treatment plants; provide desludging services to owners of individual septic tanks; refurbish existing public sewerage systems; operate and maintain these sewerage systems; and collect revenues to fund these sewerage systems. For new sewerage systems within the local authority areas, IWK’s role is to design, construct, finance, operate, manage and maintain the new systems.

The study into sewer rehabilitation techniques was conducted to provide IWK with information on the available rehabilitation technologies of sewers using trenchless techniques, detailing their advantages, disadvantages, and effectiveness. Currently, there is a total of 7,462 km of sewers which connect all major towns in Malaysia to sewage treatment plants. IWK plans to connect as many residential, industrial and commercial areas to centralised sewage treatment facilities around the country.

In most of the major towns in Malaysia, ageing sewers are in urgent need of repair, renovation or replacement. A challenge lies ahead of IWK in the rehabilitation works of the existing sewer networks in and around the country as refurbishment efforts have not been previously undertaken and most of the existing sewer lines were laid between 30 to 50 years ago.

In the past, when damage to the sewer has been extensive, the local authority or council will use the open-cut method (trench method) to lay a duplicate sewer line adjacent to the defective sewer and the old line will be bypassed while the new line will carry the flow to be conveyed. This has proved expensive and has caused disruption to traffic and people’s everyday lives. Fortunately no-dig or trenchless techniques are available for rehabilitating sewers without causing such disruption.

**Sewer system evaluation**

When evaluating a typical sewer system or network the following steps are generally covered: physical survey, cleaning of the sewer and internal inspection. The structural grading of a sewer and its hydraulic capacity are the two most important factors determining the chosen rehabilitation option. To accurately determine these factors, it is necessary to conduct an internal inspection, either visually, through closed circuit television (CCTV) or with electronic tracing equipment.

The structural condition grade used by IWK has been adopted from the WRC grading system, which has also been adopted by the Australian sewerage industry. Based on the structural performance of the sewer line, it is then possible to consider which rehabilitation method is most suitable to be used.

The target performance standard for all critical sewers on completion of the program is Condition Grade 3. Sewers in this grade can have deformation, including cracking and fractures, of between 0 and 5 per cent, joint defects, a minor loss of level or badly made connections. It is predicted that refurbishment of a single sewer network to this grade will take up to three years from conception to completion.

**Rehabilitation techniques**

In Malaysia, excavation and replacement of sewers and other pipelines has been the most common rehabilitation practice; however, as local authorities prohibit excavation in areas of their jurisdiction, this method is no longer an option for all rehabilitation works.

When it has been decided that the existing sewer is to remain in service as the defects within the sewer do not warrant complete replacement of the pipeline, repair techniques are used. Repair techniques may involve the use of injected materials to stabilise soil conditions outside of the pipeline, the sealing of leakage points in the sewer and the lining of short lengths of the pipe to give structural and sealing performance.
Applicability of repair techniques

Techniques such as lining and chemical grouting have great potential in Malaysia as these techniques are an easy and relatively low-budget option for rehabilitation. The repair method can be carried out either manually or mechanically, depending on the accessibility of the sewers. For inaccessible sewers, remote control robots or manipulators can be employed. These methods have been proven to be successful in Europe and in the United States. Replacement can be categorised into two types: on-line and off-line replacement. The on-line replacement technique is typically used when the new sewer is on the same alignment as the existing sewer, while off-line techniques are used when the new sewer is on a different alignment.

Replacement techniques offer considerable environmental benefits, as well as reduced traffic disruption and delay. The primary disadvantage is the cost. It is an expensive option and therefore it must only be applied when it is the best possible rehabilitation option. In states such as Melaka and Penang, which have especially narrow roads and densely located buildings, replacement by the open cut method may result in damage of other supply lines (water pipes, telephone cables, traffic light cables) causing chaos, public frustration, business interruption and traffic upsets.

Trenchless replacement systems have been successfully used in Singapore, causing minimum ground disturbances with negligible effects on structures and services near the work area. The measured surface and subsurface ground movements are also considerably smaller than those caused by the conventional trenching method.

Pipeline renovation typically involves the use of liners, which are applied to suit the rehabilitation needs of a particular sewer. Some of the available liner technologies include soft lining or cured-in place pipe, folded lining or deformed lining, spiral lining, spray on lining and slip lining.

Application of renovation techniques

In Malaysia, it is likely that the renovation method will be used when existing sewers can still serve the population, but have internal defects such as corrosion and leaks that have to be rectified immediately. This will be especially useful in the rehabilitation of existing property connections that are damaged, as most house owners would like to find an alternative method to having to dig through the flooring of their homes.

Cost analysis - trench versus trenchless

When comparing the costs and benefits of trenchless rehabilitation open trench pipe construction, several factors must be taken into consideration. If construction costs alone were used to compare the technologies, open trench would clearly be the more cost efficient at shallow depths. However, as depth increases, the cost of open trench excavation increases more rapidly than the cost of Trenchless Technology, so eventually the cost of Trenchless Technology and open trench are equal.

Generally, trenchless methods become more cost efficient below a depth of about 15 feet in soils above the groundwater table. When sewers are installed below the groundwater table, trenchless methods become more economical at depths where dewatering costs can be eliminated by the use of water tight caissons as drive and reception shafts (Spruch et al., 1995).

Trenching techniques are disadvantageous in that they necessitate the diversion of traffic and pedestrian movement, resulting in the obstruction of commuter and business traffic. In commercial districts, this disruption translates to redirected commercial activities ultimately resulting in decreased economic activity and lost revenues. Alternatively, trenchless methods require relatively limited excavations that can be planned to minimise the disruption of economic activities in commercial areas. Additionally, trenchless operations will typically utilise 24-hour shifts, greatly reducing construction time and surface disturbance.

The future for Trenchless Technology in Malaysia

There is no doubt that the past decade has marked the beginning of a revolution in thinking surrounding the construction and rehabilitation of underground infrastructure. The entire construction industry has experienced tremendous growth, borne of necessity for a method of construction that allows continued development of the underground infrastructure with minimum adverse impact on public life.

One of the main reasons for the growth of the trenchless industry is the growing awareness of local authorities and also the public of the decreased social costs, such as traffic disruption, economic disruption and air and noise pollution, associated with trenchless construction methods. As the Malaysian public become more aware of various trenchless construction methods, their willingness to tolerate open-cut construction will inevitably decrease.

From this study, it has been found that the sewerage industry has much to gain from the various Trenchless Technology techniques available for sewer rehabilitation. Since the study was released, several trial sewer rehabilitation using Trenchless...
Technology have been conducted by Mersing Construction and Engineering Sdn Bhd. However, prior to deciding on which technique to use, IWK has to perform a nationwide evaluation of the condition of the existing critical sewers, as until the condition of the sewer has been determined, it is impossible to determine which method is most suitable. Once the condition of the most critical sewers have been determined, it will be possible to narrow down the rehabilitation techniques and choose the most technically viable Trenchless Technology technique for the rehabilitation works.

The various techniques available have their advantages and disadvantages. Not all Trenchless Technology techniques used abroad are viable for use in Malaysia, primarily because Malaysian sewers are made of either vitrified clay or reinforced concrete as a standard practice, whereas many other countries use more flexible materials such as polyethylene and high density polyethylene, and polyvinyl chloride.

Furthermore, as Trenchless Technology is relatively new to the Malaysian construction industry, the processes must first go through a period of evaluation. During this period, it is imperative that local designers and municipal engineers be convinced that they should try these processes on their projects. Local designers and engineers may resist change unless there are certain legal regulations or clauses in contracts indicating that only Trenchless Technology can be used. Engineers and designers may also resist Trenchless Technology due to the high associated costs.

It was difficult to obtain quotes from both contractors and suppliers for the various Trenchless Technology techniques described throughout this study, although a simple comparison of the costs indicates that Trenchless Technology techniques incur higher costs due to some of the following factors:

- Only a few contractors can install the materials required of certain Trenchless Technologies, or have the expert knowledge on how to use Trenchless Technology equipment;
- Trenchless Technology equipment is generally very expensive, especially for replacement techniques such as microtunneling, pipe jacking and pipe bursting which require hydraulic or pneumatic systems; and,
- Due to the fact that social disruption, traffic disruption, loss of business and public aggravation is drastically minimised, this cost is translated or absorbed into the rehabilitation works total costs.

Although there have been significant advancements in Trenchless Technology abroad, Malaysian engineers seem to be rather apprehensive in adopting it.

Therefore, design engineers should be exposed to trenchless construction methods as early as possible in their countries. The Public Works Department (Jabatan Kerja Raya) for example, could conduct seminars and field demonstrations that serve to expose participants to the various trenchless methods available in the market. In order for design engineers to be comfortable with trenchless methods, great effort must be made in ensuring that attendees to such seminars include design engineers and not only contractors. Another way of exposing design engineers to trenchless methods is to ensure that the concept of Trenchless Technology is taught during their formal education process.

In the United States, the formation of the North American Society for Trenchless Technology (NASTT) in 1990 marked the development of a national level organisation devoted entirely to Trenchless Technology. NASTT holds annual conferences in the United States covering all aspects of Trenchless Technology and serves as a clearinghouse for information and industry contacts. The establishment of such an association for Malaysia would no doubt assist in increasing the interest and use of Trenchless Technology in Malaysia.

Until such a program is in place in Malaysia, design engineers and local authorities or municipal councils will always be at a risk. Trenchless construction and rehabilitation methods have a bright future full of opportunities in Malaysia and other countries yet to fully embrace Trenchless Technologies. It is up to local design engineers to see that this technology is used where appropriate, as inappropriate use of these methods could risk tarnishing the positive image that the trenchless industry now has achieved.

Reference

Drillers World Australia Pty Ltd
Supplier for Drilling, Trenchless & Environmental Industries

BAROID DRILLING FLUIDS & POWDERS * ENVIRONMENTAL PRODUCTS
BREWIS TRENCHLESS PARTS * DTH HAMMERS & BITS * NO-DIG EQUIPMENT
BOURNE DRILL BLADE BITS * ASAHI DIAMOND BITS * ROCK ROLLER BITS
AUSROC & EVH AUGERS & RIGS * FLEXIDRILL RIGS * TERRAMAC HDD RIGS
EDSON & GEMCO SPARES * BOART LONGYEAR PRODUCTS * RIDGID TOOLS
PVC & STAINLESS SCREENS & CASING * THREAD GREASES * SPILL CONTROL

38 Myoora Road, Terrey Hills, NSW, 2084
Mobile: 0427 9000 98 & 99
Phone: 02 9450 2432
E-mail: drillwa@ozemail.com.au
Fax: 02 9450 2437
www.drillersworld.com.au

Trenchless Australasia - June 2005

21