The Long Lasting Benefits of TV Data

Everyone in our industry knows first hand the ability to see inside a pipe is an indispensable tool for maintaining the integrity of sewers. What we are now beginning to appreciate is the benefits of analyzing multiple inspections of the same pipe over time. This article discusses what can be learned from multiple temporal inspections and the importance of making your TV data last forever.

The Significance of Understanding Changes in Pipe Condition

While an initial CCTV inspection of a pipe segment will provide knowledge of the pipe condition today, we also need to know what conditions we can anticipate for that pipe in the future. We need to improve our capability to identify, understand, and anticipate changes in pipe conditions. That capability will be developed by benchmarking pipe conditions over several years, analyzing what deterioration factors contributed to changes in the pipe, and where the absence of deterioration factors was demonstrated to result in little change in condition.

We have many anecdotal stories and opinions regarding what causes pipe deterioration, but little real data to base those opinions. Without a more structured and detailed approach to sewer assessment and planning, the industry as a whole will lack the knowledge needed to make better rehabilitation decisions.

Standardization of Inspections is the First Step

It is much too time consuming to have to fully view each inspection. Therefore the sewer inspection industry has developed codes and coding standards that are used by the operator to record what is seen. One example of standards for TV inspection is the Pipeline Assessment and Certification Program (PACP) developed by NASSCO with assistance from the Water Research Centre (WRc) based in Swindon England. The WRc codes have been used in the United Kingdom since 1977 and the PACP is a version of those WRc codes adapted for use in the United States. Many utilities have developed their own coding standards that work just as well.

The lack of standards for TV inspection in the United States has greatly limited our ability to better understand deterioration factors in sewers. However as the use of standard coding becomes more widespread we will quickly have at our disposal many more opportunities to improve our pipeline condition management.

Each inspection must be coded accurately and consistently. Implementation of a QA/QC protocol where selected inspections are more closely checked for accuracy will improve the reliability of the coded data. With use of standard codes, training of operators and QA/QC, the data can then confidently be used for a variety of purposes including temporal analysis.

It is very important that the utility make a strong commitment to use standard coding practices for all inspections now and in the future. This applies to inspections provided by contractors, construction warranty inspections, engineering projects, routine assessments, etc. If inspections are conducted thoroughly and consistently regardless of the purpose for the inspection, the pool of segments available for deterioration analysis

will be substantial. Since the vast majority of TV inspection data today is collected using inspection software, the utility must insure that all inspection software used properly implements their coding standards.

Benchmarking of multiple pipe inspections over a period of many years means the utility must make the commitment to stick with the same coding standards. Otherwise comparison of multiple inspections using different coding systems would be impractical.

Preserving the Shelf Life of TV Data

Perhaps the biggest challenge for a utility is developing a strategy that insures their TV data will be available for many years into the future. Resolving this issue requires more than standardization of coding and QA/QC of data.

In the past the type of TV inspection software used by a utility was largely dependent on whom the successful TV equipment vendor was. It is still not uncommon for a utility to have software from multiple vendors in use by their own crews and contractors. The ability to exchange TV data from one application to another is dependent on the capability of the individual software vendor. More often than not the data potentially could become orphaned and never used again.

Inevitably TV inspection software, software versions, vendors, operating systems or a particular utility's vendor preferences change. Therefore the utility must have long term strategy that provides the ability to export the data into a vendor neutral data exchange format. This then provides a path for continuous archiving of the data, and a means for making the TV data available for other purposes. The data exchange format should be well defined and maintained by the utility.

Equally important is that the utility require all proposed software vendors be able to import data from the neutral data format. If the software has limited capability and can not import data, it will not be able to support previous inspections or new inspections from other vendors.

The Process for Understanding Change

The process begins with the first inspection. All visible defects, deterioration factors, material types, point repair and tap locations are recorded and thus date-stamped as a starting point. Many times the type of defects can be categorized as being construction related, third party damage or caused by maintenance activities.

One of the most obvious maintenance related factors are roots. Although the immediate consequence of roots is the fact they can restrict flow and create blockages, they can also necessitate frequent and aggressive cleaning that can perhaps cause structural damage to the pipe. Particular attention should be given to change in structural condition attributed to aggressive cleaning. As we obtain more experience in pipe condition management we may find roots to be a very significant deterioration factor.

Other significant deterioration factors that should be noted are the occurrence of surcharging and the presence of groundwater infiltration. Surcharging of gravity sewers provides an opportunity for the pressurized wastewater to exfiltrate out of the pipe and into the surrounding soil, and perhaps softening support of the pipe. When the surcharge

is relieved, the water can then return back inside the pipe, bringing soil from the outside to the inside of the pipe.

In absence of significant deterioration mechanisms we may find little change in pipe condition. For example a 100 year old pipe can have significant structural defects deemed to be construction-related. With no significant deterioration mechanisms in place to further disturb the pipe, the pipe may reasonably be expected to last many more decades.

Rather than waiting 5 or 10 years before the next inspection is available, consider retrofitting of existing TV video. The current inventory of videos can be cherry-picked based on criteria such as criticality of sewers, maintenance history, and the date the old video was obtained to select the most interesting inspections for retrofit. Retrofitting will provide the utility an opportunity to hone their process for pipe condition change assessment.

Summary

It was once common practice to discard the old TV inspection data as soon as a new inspection was completed. But by implementing standard coding practices, QA/QC of the data, and rigorously maintaining a database of all inspections, we can develop entirely new perspectives on how quickly pipe deteriorate, what causes pipes to deteriorate, and perhaps be pleasantly surprised that old pipes are not necessarily always bad pipes.

TV data does not have to be current to be valuable. Imagine the knowledge we could gain if we had periodic TV data for every sewer pipe from construction. The challenge for the utility manager is to create a path for stewardship of all pipeline condition data for other generations to follow.