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SPIRAL WOUND LINERS AND THE PIPE REHABILITATION INDUSTRY

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There are several well-known technologies for rehabilitating gravity pipelines as well as many new emerging methods. Having the option to renew aging sewers, storm drains, culverts and more with trenchless technologies not only minimizes the construction footprint, it also provides a more cost-effective repair solution to traditional dig and replace construction practices. One of the trenchless technologies being used by municipalities today is spiral wound liners, a rehabilitation solution utilizing wound PVC to form a structural liner inside a deteriorated pipeline. There are several domestic and global manufacturers that offer this technology, with their capabilities ranging from small to large diameter with some offering non-circular custom shaped liner solutions. This summary will take a broad view of some of the features and benefits of spiral wound liners and insightful tips regarding the usefulness of this pipeline rehabilitation solution.

Technology Basics
The spiral wound lining method is a structural rehabilitation solution that restores the hydraulic properties of deteriorated pipelines. Spiral wound liners are mechanically installed and do not require chemical processing as part of the installation process. The construction footprint is small and the installation is fast and efficient.

Spiral Wound PVC liners are extruded at the factory and coiled onto a large drum, then shipped to the job site. Once onsite, the profile is fed into a winding machine that is positioned at the base of the access chamber. No access pits are required.

A continuous strip of PVC material is then fed into the winding machine, and the liner is constructed onsite within the host pipe. The PVC profiles are designed to interlock with each subsequent strip of material during the winding process. The profiles include gasketing materials that, once wound into place, form a tight-fit mechanical lock. Depending on the project and manufacturer, spiral wound liners can be designed as a tight fit or as a fixed-diameter grouted solution. Currently manufacturers offer tight fit lining systems for diameters 8" – 60" that do not require annular space grouting and fixed diameter grouted solutions for 36" to 200" and larger including circular and non-circular applications, utilizing a wide range of structural and non-structural grouts.

Capabilities
Spiral wound liners provide numerous design and constructability advantages. This method currently renews gravity pipeline networks such as sewers, storm drains and culverts. They also provide a structural repair solution for partially and fully deteriorated pipe conditions capable of withstanding all applied loads. Spiral wound liners can rehabilitate a wide range of host pipe materials including brick, concrete, clay, CMP, etc. Additionally, with the improved Manning's coefficient of PVC, hydraulic capacity is typically increased post-rehabilitation.

As spiral wound liners are mechanically installed, there are no chemical by-products to dispose of. The mechanical installation process also allows the contractor to start or stop at any point during the installation process as needed to guarantee a successful liner installation.

Additionally, spiral wound liners can be installed in live flow, typically without the need for bypassing. There is no adverse effect on the mechanical equipment or installation process when exposed to flow. Once the liners are installed, laterals can be immediately reinstated. Spiral would liners also conform to relevant ASTM standards such as ASTM F1697 and ASTM F1741, which define standard practices for machine installations of spirally wound PVC.

Truly Trenchless
One of the main benefits for most spiral wound methods is that no site excavation is required. Installations are completed from existing access chambers and require no additional digging. Winding machines are capable of being assembled/disassembled to pass through standard manhole chambers. The PVC profiles are fed from spools of profile material above ground to the installation equipment in the access chamber as the liner itself is formed directly inside the deteriorated pipe. Furthermore, the entire installation set-up is portable and can easily be mobilized to remote access project locations.

Technology Advancements
Spiral wound liners are an expanding trenchless rehabilitation lining solution. New profiles and state-of the-art installation equipment are continuously being introduced for use on rehabilitation projects. Capabilities within the United States have increased over the past few decades as manufacturers have entered the market and contractors become exposed to this innovative method. Spiral wound liners have become another useful tool in the growing trenchless rehabilitation industry.