LONGEVITY OF PVC PIPE & FITTINGS

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MUNICIPAL PIPING SYSTEMS

Engineers and designers in North America have clearly embraced the use of PVC piping systems for use in buried infrastructure projects. This is due to a number of clear advantages PVC systems have when compared to other materials:

- *Resistance to corrosion and chemical attack*
- *Ease of installation*
- *Excellent hydraulic characteristics*

Another key reason for specifying PVC systems is longevity. While PVC is often perceived as a relatively new innovation, the fact is that PVC systems have been in service for much longer than most people realize.

PVC piping systems have been in service since the mid-1930's, and have built up an impressive track record over the years. The first installations were in pre-war Germany, and many of these are still in service today. PVC piping systems have been in service in North America since the mid-1950's, and have been the most commonly installed material since the late 1970's.

Design Life

In order to carry out lifecycle costing calculations, designers must estimate the service life expected from a material. Because PVC is immune to corrosion, a minimum service life of at least 100 years can be expected. This figure is supported by a number of independent studies, as well as the experience of many long-term users of PVC piping systems. Some of these studies include:

AWWA Research Foundation – "Quantifying Future Rehabilitation and Replacement Needs of Watermains," 1998. This study used a highly specialized computer model to estimate the life of various materials based on past performance. PVC was rated at a minimum 100 years while concrete and ductile iron were rated at 85 and 60 years respectively.

City of Edmonton 'PVC Pipe Study' – A comprehensive performance study of PVC pipe installed in Edmonton since 1977 concluded that its service life could be conservatively rated at 88 years or more.

Case Studies from Europe and North America including:

- Dallas, Texas – A PVC sewer pipe installed in 1973 was excavated and subjected to each of the tests outlined in ASTM D3034. The results show that the excavated pipe still met all the standards applicable to new pipe, even after 30 years in service.
- Denmark – A PVC sewer pipe installed in 1963, was excavated. Test results show that the pipe has the same material properties as newly produced pipe.

Manufacturers of older, more traditional materials like concrete and iron will claim that their materials have a much longer track record than PVC and should therefore be given credit for a longer design life when using lifecycle costing techniques.

However, while it is possible for an iron or concrete system to perform well for the long term, all too often they fail as a result of corrosion in the case of iron, and chemical attack in the case of concrete.

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