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NATIONAL CLAY PIPE INSTITUTE
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TECH NOTES

IS LESS REALLY LESS?

An Economic Approach to Sewer Pipe Selection

When comparing alternate bids of pipe with different life expectancies, the lowest initial bid is not always the best bid or in the best interest of the owner.

Planning, engineering and material selection must be based upon long-term factors and the selection choice must be cost-effective. The goal is to select the pipe material which will provide the greatest value when compared in accordance with accepted principles of engineering economics.

The following least cost illustration is based on actual bid prices. While it was a local project with funding based on municipal bonds, calculations are also included using Interest/Inflation Factors for Federal and Private Funding to illustrate why the source of funding is of particular importance.

The Total Effective Cost (Current Dollars) of the limited life pipe is determined from the equation:

EC = Pd+Kl+D/d+i)]" + [(l+I)/(l+i)]2Il.....[(l+I)/(l+i)]^m}l

Where:

EC = Total Effective Cost (Current Dollars)

P = Bid Price (Current Dollars)

I = Inflation Rate over the period of the Project Life (percent)

i = Interest Rate over the period of the Project Life (percent)

n = Service Life of the material (years)

mn = Number of times the material with the limited life must be replaced to equal the longer service life material

The Interest/Inflation Factor equals (l+I)/(l+i)1

Example

A project specified 7,929 feet of 24 inch sanitary gravity flow sanitary sewer. Project service life is 100 years. Both VCP and a limited life pipe were bid. The successful bidder bid $677,967 for VCP

and $618,009 for limited life pipe.

Determine the most economical bid using Least Cost Analysis. A project life of 100 years has been assumed. The determined service life for VCP is 100 years. The service life of the limited life pipe has been extrapolated to 50 years.

	State/Local	**Private**	**Federal**
Project Design Life, years	100	100	100
Inflation/Interest Factor[2]	0.9864	0.9679	0.9760
Vitrified Clay Pipe			
Initial Installed Cost	$677,967	$677,967	$677,967
Service Life, years	100	100	100
Limited Life Pipe			
Initial Installed Cost	$617,390	$617,390	$617,390
Service Life, years	50	50	50
Effective Cost, VCP	$677,967	$677,967	$677,967
Effective Cost, Limited Life Pipe	$928,714	$738,194	$800,642
Cost Advantage VCP			
Over Limited Life Pipe	**$250,7474**	**$60,226**	**$122,675**

If the limited life pipe is selected, the funds required to be set aside now to provide for future replacement, in addition to the Initial Project Cost are shown below:

Set Aside Required	$ 311,324	$ 120,804	$ 183,252

If limited life pipe is selected, and if the funds are not set aside to rebuild the project after 50 years, and if the annual inflation rate over the period is 6% (approximate average annual inflation rate 1954-1992) the cost of replacing the sewer will be **$11,372,419.**

Footnote:

1,2 - Taking the Guesswork out of Least - Cost Analysis, W. 0. Kerr, Ph.D. and B. A. Ryan, Arthur Young & Company. Updated by W. 0. Kerr for NCPI - April, 1993.