

DEVELOPING A DETAILED CAPITAL EXPENDITURE PROGRAM FROM THE CONDITION ASSESSMENT OF PIPELINES

Philip Ferguson, EarthTech Engineering Pty Ltd

ABSTRACT

With an increasing demand on capital, water authorities need to utilize better asset management techniques than those that have been used traditionally, such as failure data and age. This approach can lead to the inappropriate replacement of entire pipelines and sections of pipelines, with associated over and under spending, and rely on the pipeline experiencing numerous failures before action is taken. In order to avoid the multiple failure scenario, suitable condition assessment of the pipeline needs to be undertaken.

Once the potentially critical pipelines have been identified, in order to generate a detailed program, the following process needs to take place:

1. Design of investigation taking into account the age, pipeline material, cost-effectiveness, etc.;
2. Determination of physical condition of pipeline (by suitable and effective direct or indirect measurements);
3. Analysis of results from physical measurements to produce key outputs;
4. Determination of probability of failure, failure predictions, and distribution of condition, as a function of time and space;
5. Determination of cost of replacement for various sections/subsections;
6. Determination of capital expenditure as a function of time for the various sections/sub-sections and level of risk.

The most critical step in the program is the establishment of failure probabilities from inspection and analysis of the pipeline data. This has been achieved through the utilization of proprietary PipeFail and EnviroStat algorithms, which have been verified in many instances by comparison with predicted and actual results of pipeline performance.

This paper outlines the processes involved in establishing a detailed capital expenditure program, and describes a case study of a 9km DN600 cast iron main in detail. Outcomes from these studies can also be used to improve life estimates for global planning tools such as "KANEW "and CAFÉ that rely on accurate survival/performance information.

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