

CONDITION ASSESSMENT OF PIPELINES THROUGH PROPER PLANNING AND DESIGN

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ABSTRACT

The author has been involved in failure investigations, pipeline performance and condition assessment for more than 25 years. Businesses he has managed have assessed more than 3500km of pressure water and wastewater pipelines, in Australia and South-east Asia. During this time he has been involved in Quotation, Design, Implementation and Interpretation of Condition Assessment Projects and Programmes. The success of these programmes have largely been determined by the Design and Methodology required to produce a “Useful” outcome.

Design of a Condition Assessment strategy involves the following steps :

- 1) Identification of Specific Outcomes required from the investigation;
- 2) Identification of mode of failure of pipeline material;
- 3) Structured methodology to determine likelihood of failure of pipeline or sections of pipeline;
- 4) Correct choice of cost-effective technologies for each pipeline material;
- 5) Estimates of probability of failure of pipelines or sections of pipelines.

Step 1 is essentially determined directly or indirectly by the Regulator, and may differ from one authority to another.

Step 2 is critical as materials perform differently, and although condition may be important, some materials frequently fail with little deterioration of original condition. Also, the frequency or distribution of the failures will not be uniform. In most cases, the pipes exhibiting worst condition will be most likely to fail. These however, will be relatively few in number within a pipeline.

Step 3 uses a multi-stage approach and may require the utilisation of more than one technique.

Step 4 enables the correct choice of technologies. No single technology produces the “whole” picture, but some reveal more than others. In this stage verification and fitness for purpose need to be determined.

Step 5 should ideally match the original requirements of Step 1.

Several examples of projects in Australia and Hong Kong will be presented to illustrate the importance of proper planning.