

TECH TIPS

FROM NASSCO

TECH TIPS BY NASSCO IS A BI-MONTHLY ARTICLE ON TRENDS, BEST PRACTICES AND INDUSTRY ADVICE FROM NASSCO'S TRENCHLESS TECHNOLOGY MEMBERSHIP PROFESSIONALS.

PACP CONDITION GRADES AND THEIR PROPER APPLICATION

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When NASSCO's Pipeline Assessment and Certification Program (PACP®) was developed with the Water Resource Centre (WRc) in Swindon, England, NASSCO added condition grades to defects to help prioritize maintenance, rehabilitation or repair of line segments. Condition grades were developed as a "one size fits all" score based mainly on the defect coded, and not on other deterioration mechanisms that are covered in the PACP class. For almost 15 years, engineers and municipalities have used PACP condition grades for prioritization, and while the use of condition grades and segment scores has been helpful to asset management programs, those using the data should clearly understand that they do not tell the complete story.



A BROKEN PIPE IS ONE IN WHICH PIECES ARE NOTICEABLY DISPLACED AND HAVE MOVED FROM THEIR ORIGINAL POSITION.

DESCRIPTORS:

BSV (Soil Visible): Soil surrounding the pipe is visible, but the soil surrounding the pipe is still in place and does not appear to be eroded

BVV (Void Visible): The outside of pipe is visible, and a void or cavity has formed outside the pipe

UNDERSTANDING DEFECT GRADES

The CCTV user should understand that the condition grade of a particular defect depends upon the correct PACP code being entered, and not each operator's opinion. Only by allowing the grades to be assigned through accurate PACP coding will the condition grades be consistent. Otherwise, we lose the benefits of standardization when the codes are based on each operator's opinion and not on what is actually observed.

Each defect observed is assigned a condition grade from 1 to 5, with 5 being the most significant defect grade and 1 being a minor defect grade. When an operator assigns a PACP defect code, the code and specific information entered with the code, such as percentages or clock positions, relate to a specific condition grade from a table in the PACP manual.

This grade is assigned by PACP (not the operator) either by looking it up in the PACP manual, or automatically through NASSCO certified software. Condition grades are then used to calculate scores for the entire segment (or manhole) to help prioritize renewal efforts. Segment scores can also be used to develop consistent "Likelihood of Failure" (LoF) values, which can be used with "Consequence of Failure" (CoF) values to develop risk assessments within an overall asset management program.

For example, a pipe exhibits structural defects such as cracks, fractures or broken sections. The defect is assigned a condition grade based on what is observed and its severity level. A single crack, defined as a break line which is not visibly open, running lengthwise down the pipe, is coded as Crack Longitudinal (CL). A CL is a grade 2. If this crack becomes visibly open, it is defined as

a Fracture Longitudinal (FL) and the condition grade increases to a 3. If the pipe pieces become displaced, it is coded as a Broken (B) and the grade increases to a 4. However, if there is soil or a void visible behind the broken pipe wall (BSV or BVV), it is a grade 5. A complete inspection of the segment might include several structural defects as well as O&M defects that could be used to calculate an overall segment score based on the number and severity of the defects observed in the line for both structural and O&M defects.

BENEFITS AND LIMITATIONS

Those professionals that use PACP data for making recommendations and decisions need to understand both the benefits and limitations of the condition grades and segment scores. The PACP Condition Grading System cannot take into account factors such as material (although we have worked toward this when redefining rigid versus flexible deformation), changes in loading, voids and other external pipe conditions.

When condition grades are used to develop the LoF values, these factors should also be considered. Further, condition grade alone is inadequate for determining if a pipe segment should be replaced or rehabilitated. **The condition grades cannot take the place of an engineer's judgement.**

It is tremendously important that the PACP technician document defects and observations consistently and accurately in accordance with the definitions included in the PACP Reference Manual so that the condition grades remain consistent. It is equally important that those professionals using this data understand the benefits and the limitations of the data.