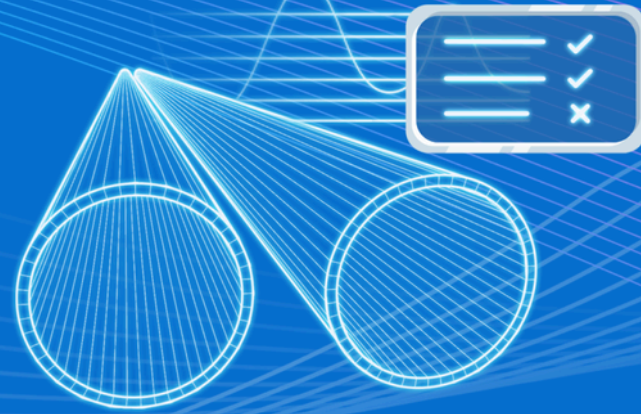


CASE STUDY

Validated Condition Assessment of Metallic Water Mains in the City of Gresham, Oregon



The Challenge

The City of Gresham, Oregon, faced significant challenges in assessing the condition of its critical water main infrastructure, comprising 6", 8", and 10" cast iron (CI) and ductile iron (DI) water mains. This assessment was crucially needed as part of a larger roadworks project involving the repaving of 25% of the city's roads. The water mains, identified as high-risk during the city's targeted risk assessment efforts, required a thorough and timely examination. Challenges included an aggressive timeline, logistical difficulties due to long distances between pipeline access points, and substantial background noise from ongoing roadworks, which could interfere with the acoustic-based inspection methods.

The Solution

In November 2023, the City contracted KenWave to utilize its patented Dynamic Response Imaging (DRI) technology to assess the pipeline conditions. This non-destructive, non-invasive method allowed for accurate evaluation with minimal physical intervention.

DRI works by generating and analyzing acoustic waves within the pipeline, identifying variations in material properties and detecting flaws or degradations. The technology's capability to provide a structural thickness profile with high resolution (6 feet) enabled efficient detection of degradation zones and structural inconsistencies. Even in areas with sparse access points, KenWave's DRI technology effectively extended its inspection capability up to 887 feet, demonstrating potential for reaching lengths up to 1,500 feet.



KenWave DRI device generating vibrations in the City of Gresham.

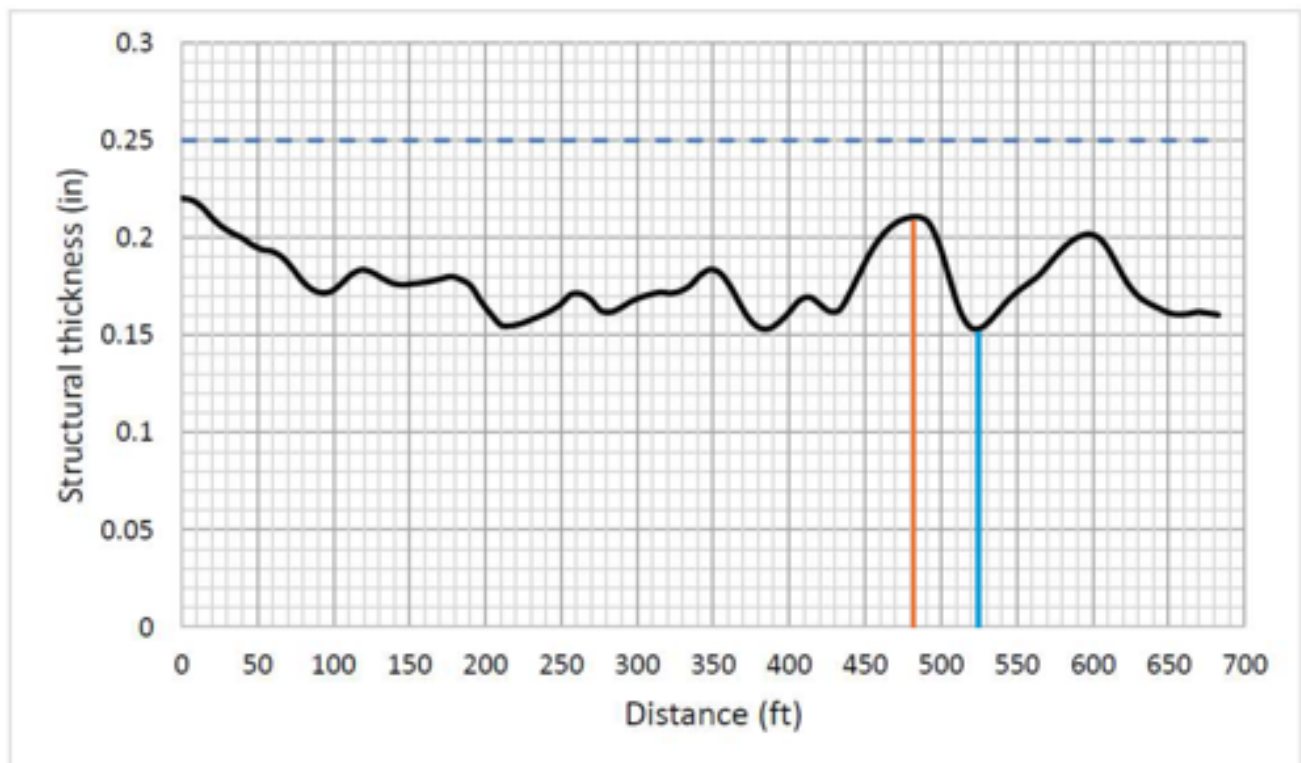
The Results

KenWave's application of DRI technology successfully achieved a structural thickness profile with a high resolution of 6 feet, pinpointing significant degradation across inspected lengths. To verify the DRI results, the City of Gresham conducted a validation project using ultrasonic testing (UT) on pipe coupons from seven specific locations. The UT testing corroborated the DRI findings with an impressive 95% to 99% accuracy rate, confirming the reliability of KenWave's technology in assessing both CI and DI pipes.

The project not only provided the City with essential data to prioritize maintenance and replacement efforts but also underscored the potential for integrating advanced diagnostic technologies with traditional civil infrastructure projects. This case study exemplifies how innovative technology can significantly enhance the management and longevity of critical public utilities.



Validation of KenWave DRI technology showing distress on a section of ductile iron pipe.



Graph showing how KenWave data (black) lined up with both the coupon data (blue) and ultrasonic testing data (orange)