Clearline Profiler Inspection Report

Date: 24th February 2006

Customer: ProPipe and Brown & Caldwell

Pipe Size: 33in

Material: Concrete

Why are we profiling this pipe? : Severe H_2S erosion of concrete pipe causing pipe to 'change shape'. Need to know shape and dimensions in order to better design rehabilitation of the pipeline.

Key People:
ProPipe – Fernando Espriu
Brown & Caldwell – Thayne Loendorf

Report on inspection:

The line inspected has major traffic flowing most of the day and night. The rehabilitation method being implemented is CIPP relining. The consultant/engineer, Thayne Loendorf, wants profiler inspection information on the shape and dimensions of the deformed concrete pipe. This information would help him better understand what is happening in the pipe and ensure he provides the best rehabilitation design for his customer.

Figure 1: The site above ground

The inspection setup was one manhole upstream of the target pipeline. The first section was clay circular 33in pipe. This was used to verify the laser profiler setup.

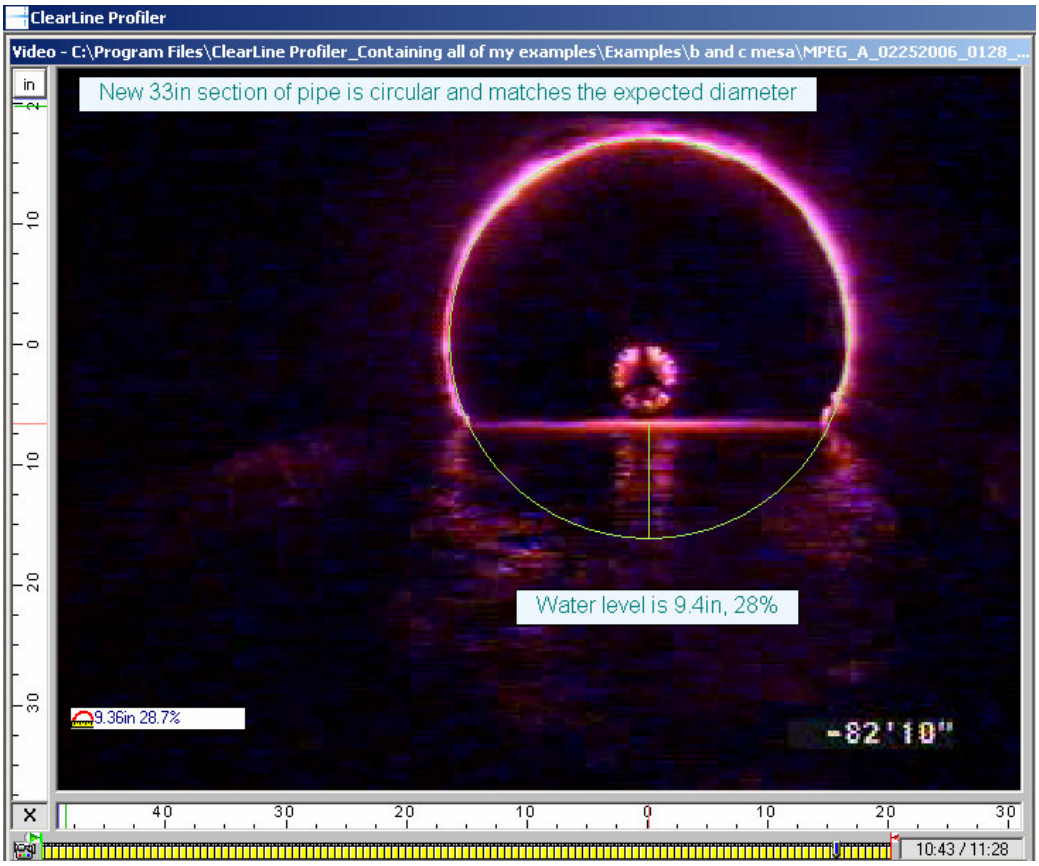


Figure 2: The profiler setup verified and the water level is about 28% for the line.

As expected the standard CCTV inspection detected where the pipeline had partially collapsed and that there was severe erosion along its length. It was not clear how much. During the lights off laser profiler inspection it became very clear that the pipeline had deformed into very unusual shapes along its length. Further clarification was obtained after post processing the laser video inspection.

A very good profile inspection was obtained for the length, except where the lights had been turned on at the engineer's request, an experiment. The water level was removed from the profile data.

As is typical for H_2S erosion, the Capacity graph was used to highlight any changes in profile cross-sectional area.

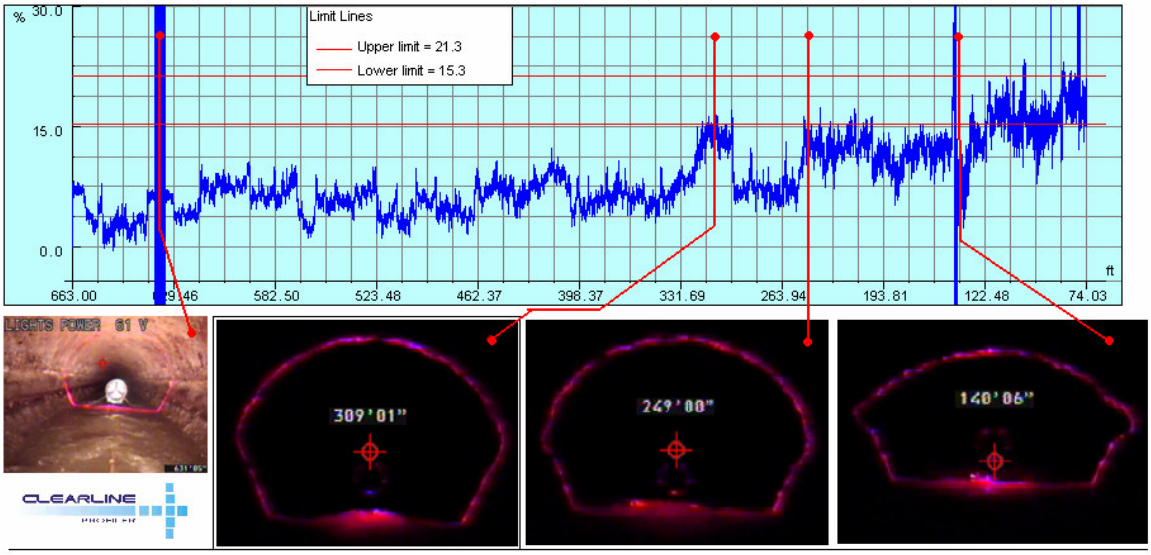


Figure 3: The ClearLine Profiler Capacity report with selected video profiles

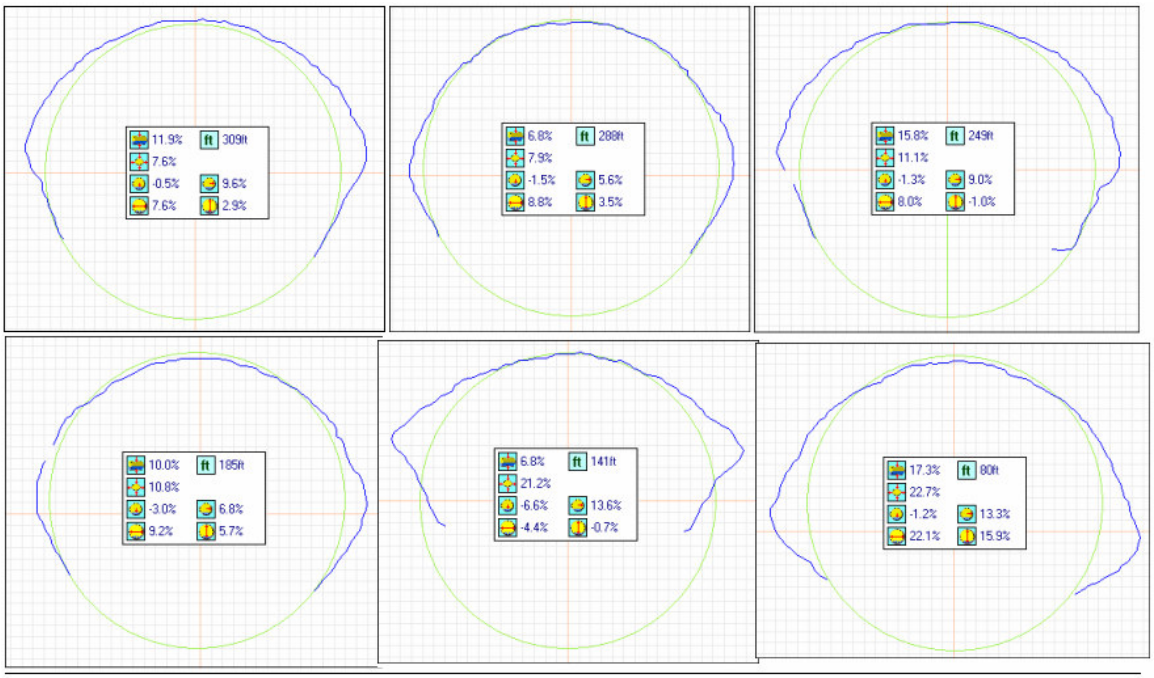


Figure 4: The digital profiles

In this case the Ovality graph, a structural integrity indicator, compliments the Capacity graph. The graph in figure 5 shows a gradual increase in Ovality until the sharp increase, as expected, at the partial collapse section of the pipe. Also note worthy is the large amount of Ovality at and around 80ft.

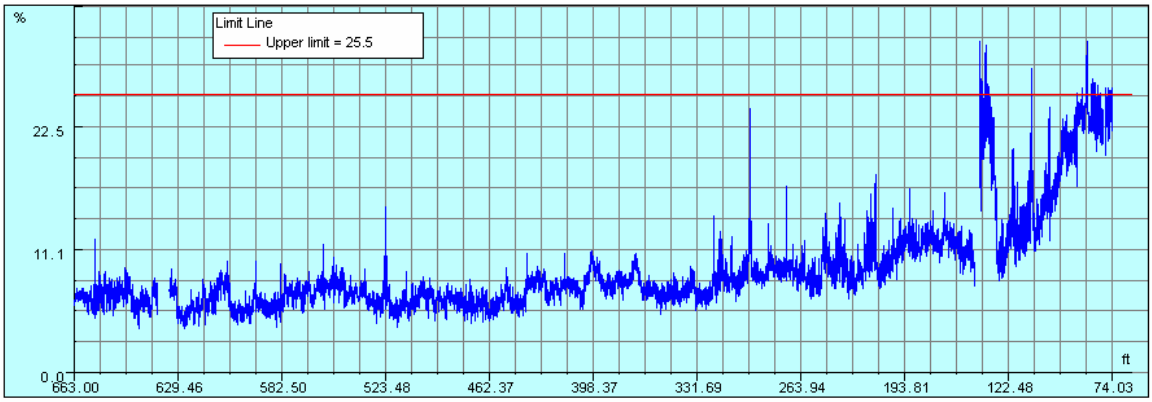
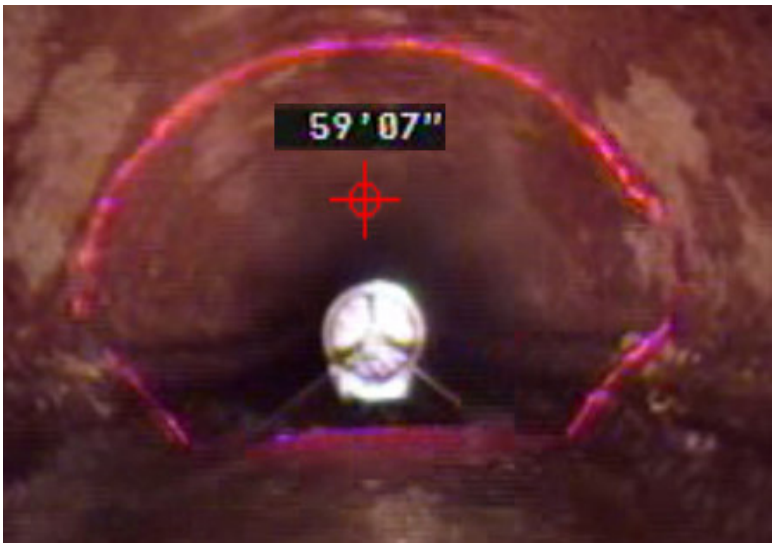
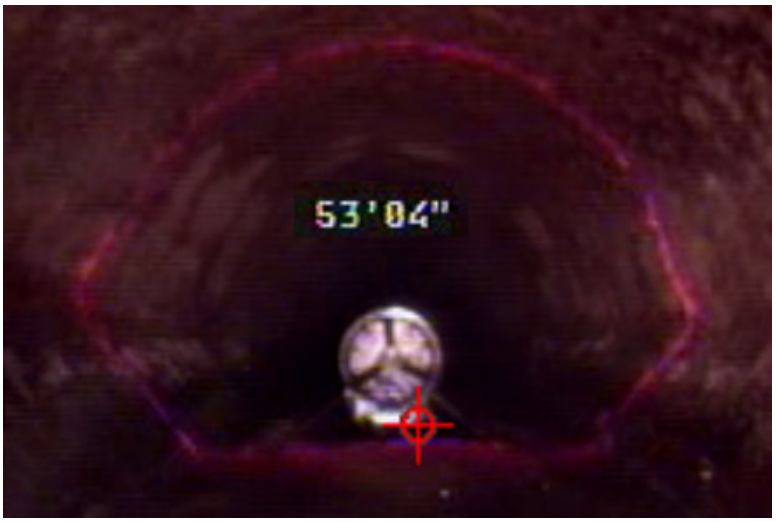
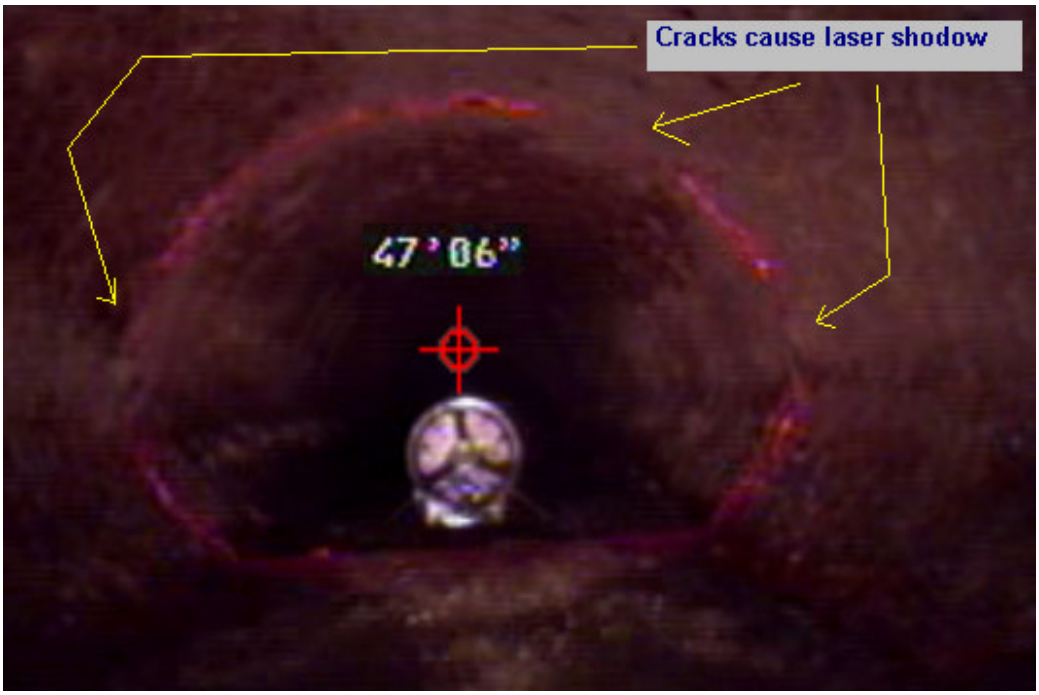


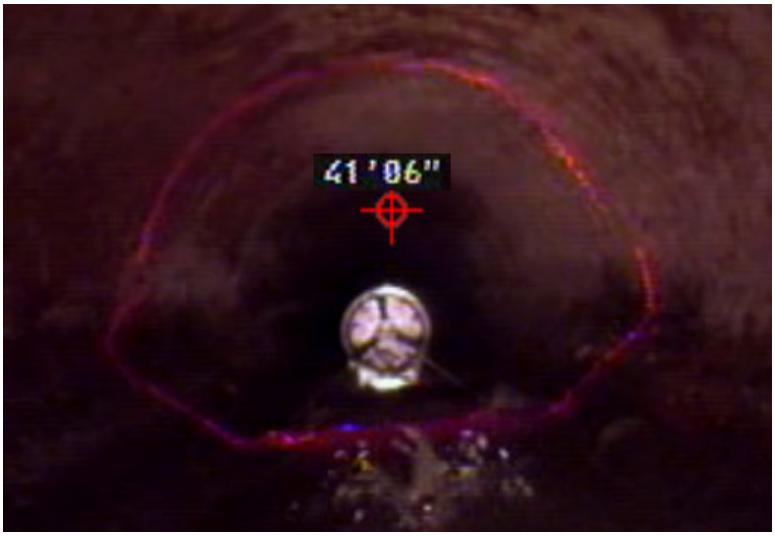
Figure 5: Ovality graph – as expect, severe Ovality at 141ft. Also large at and around 80ft.

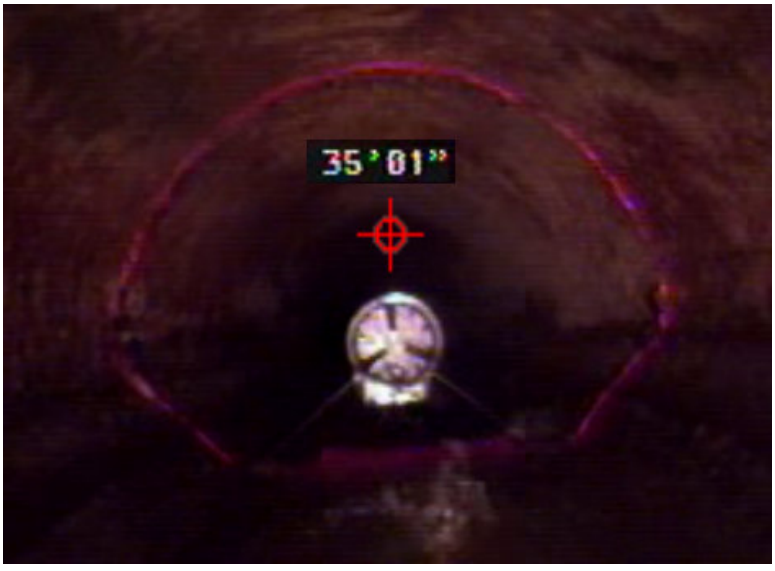
The remainder of the inspection had partial lights on, with the condition of the pipe, this made obtaining Precision Vision profiles very difficult. A higher resolution video file format would provide better results. The following are a selection of profiles collected over the remainder of the pipeline. Of particular interest, is the hole or lateral at 59ft and the cracking at 47ft.











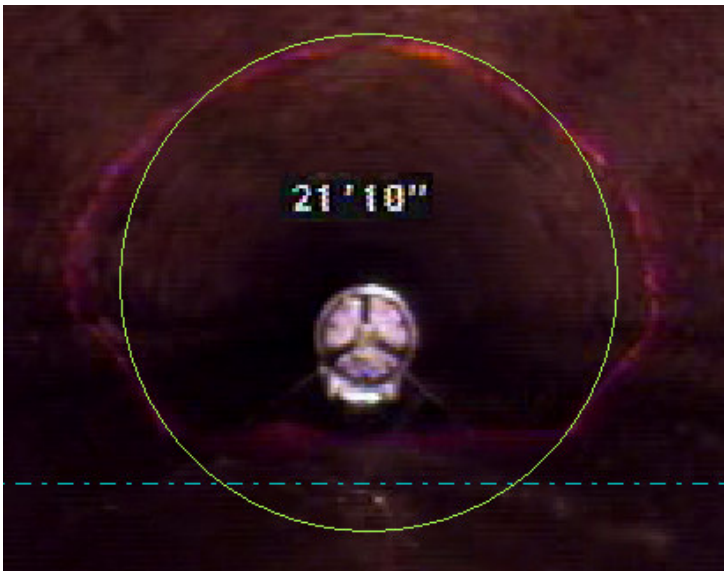


Figure 6: A selection of profiles from 70ft to 0 ft.

The Flat graph, the use of color to define depth or changes in dimension, correlates well with the Capacity and Ovality graphs.

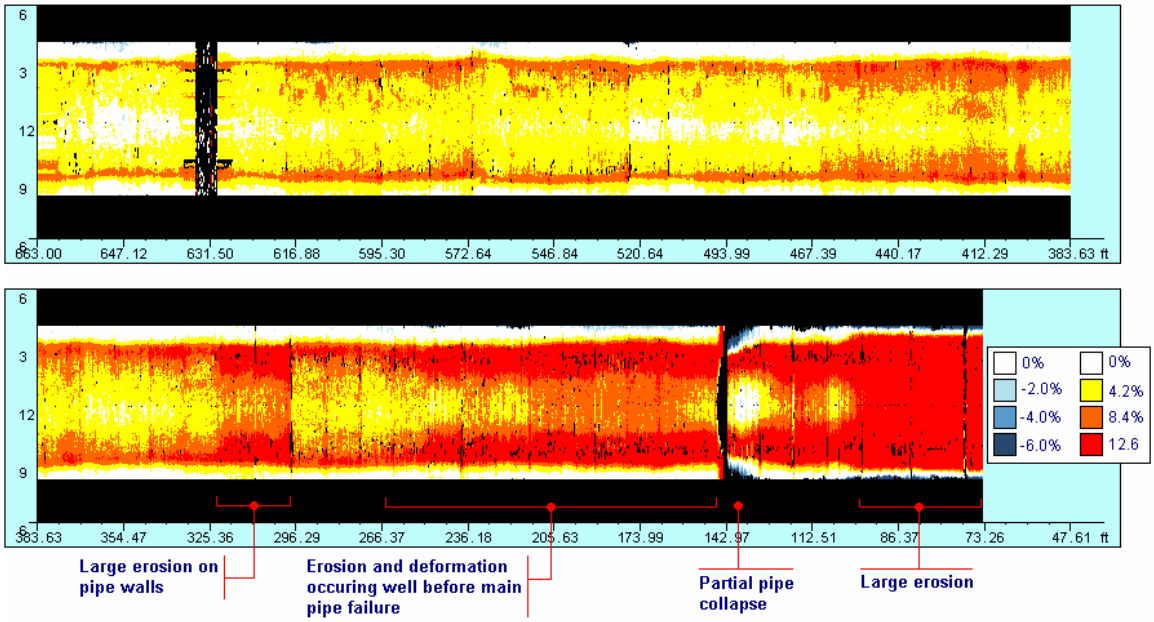


Figure 7: The Flat graph highlights the changes in the erosion along the pipe walls.

Often it is convenient to represent a series of profiles in a 3D form. The 3D helps visualize the graphs, profiles and data in a way that is easier for the mind to digest. This report just contains three examples. For best reports use the software to navigate around the 3D structure.

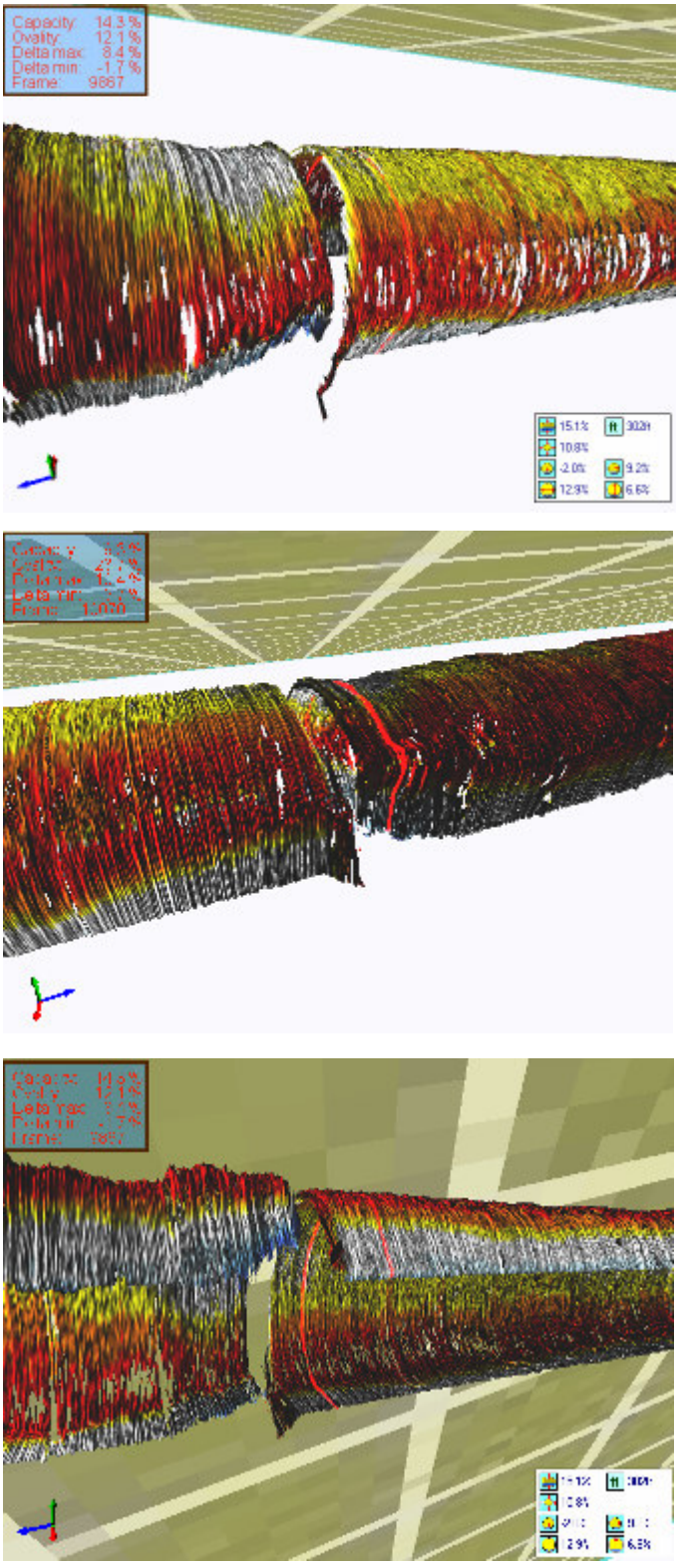


Figure 8: 3D of the area around the partial pipe collapse.

Final Notes:

Without a doubt the ClearLine Profiler was once again able to demonstrate real value when conducting a condition inspection on a pipeline. The information delivered should be very useful to the rehabilitation design engineer when determining the nature of the erosion and deformation of this pipeline.

It took much longer to write this report than it took the ClearLine Profiler software to generate the reports and profile data.

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