Failure investigation of natural gas pipeline

Abstract

A study was carried out to investigate the probable cause or events that might have led to the failure of two parallel natural gas pipes, API 5L X42 carbon steel (NPS 8) and the SDR 17, 125 mm medium density polyethylene pipes. These two pipes were laid side by side in the same trench with a water pipe. The investigation was performed by analyzing the existing design and construction data, visual inspection of failed pipes, and pipe material analysis. Investigation from the relevant pipes data suggests that the leaked water pipe was the ?rst to fail. The leaked water pipe created high pressure water jetting that mixed with the back?lling soil to form water–sand–soil slurry with high erosive properties. The impact of this erosive slurry upon the NPS 8 pipe had caused serious losses of pipe coating materials. This phenomenon explains the rapid thinning of the steel pipe body which later led to its failure. Evidence from the metallurgical study using photomicrograph showed that the morphology of the steel material was consistent and did not show any evidence of micro fractures.