Experimental study on the application of ultrasonic guided wave technology in low-pressure gas pipelines

Xiaojiang Tian[1], Shasha Wang[2], Guanling Gao[1], Tao Luo[1], Ruichuan Li[3], Fuhai Shi[4],

[1]Beijing Gas Group Company Limited,[2]Corrosion and Protection Center, Institute of Advanced Materials and Technology, University of Science and Technology Beijing,[3]Sichuan Jishi Technology Company Limited,[4]Tianxing Company.

Abstract：In view of the applicability of ultrasonic guided wave technology on low-pressure gas pipelines, test experiments were carried out on typical indoor unburied failed pipe sections, outdoor buried pipe sections and actual field service pipelines. The effects of different soil compaction, different defects, different pipe diameters, different pipe section lengths, welds, elbows, tees and pipeline deformation on the detection effect of ultrasonic guided wave technology were explored, and the influence of different factors on ultrasonic guided wave technology detection was clarified. The experimental study of typical indoor unburied failed pipe sections found that soil compaction, pipeline defects, welds, elbows, tees and pipeline deformation would cause different degrees of attenuation of ultrasonic guided wave detection signals. The experimental study of outdoor buried pipe sections found that with the decrease of soil resistivity, the effective detection distance of ultrasonic guided wave technology showed an overall decreasing trend. The field test of the actual service pipeline excavation found that the test results of ultrasonic guided wave technology were basically consistent with the actual excavation corrosion results, and the effective detection distance on the actual service pipeline was about 15m~30m. This conclusion has important practical guiding significance for the application of ultrasonic guided wave technology in the actual service low-pressure gas pipeline.