Failure Analysis on Fracture of Vent Gas Pipeline

Xiaofang Ma, Weiwei Li and Yixin Qu
CNPC Tubular Goods Research Institute
Xian, Shaanxi, China

ABSTRACT
Failure of a vent gas pipe was investigated through visual inspection, mechanical properties testing, and analysis of construction and operating conditions. Results showed that fracture failure was mainly due to the transverse impact during the pipeline construction, resulting in the original split that not completely disconnected, and high pressure in pipeline caused complete rupture.

KEY WORDS: Vent gas pipe; failure; fracture; analysis; scratches

INTRODUCTION
In July 2012, a staff of gas transmission station planed to replace the sealing ring in Jinghe, Xinjiang. When the gas pressure of filter separation vent came to 4.0MPa, it was found that there was gas erupted in the ground, and the stone was lifted up about 10 meters high. The emergency plan for natural gas leakage was immediately launched. After emergency treatment and recognition of no combustible gas leakage, it was observed that there was a hole about 20 cm in diameter in the ground. The 1.2-meters deep pipe of the leakage tube was dug out; it was found that the leak pipe has been completely broken, as shown in figure 1. The pipes are hot rolling seamless steel tube, the material of the tube is L245NB, and pipe specifications are Φ 89 × 6. The pipeline was put into operation in 2009.

Fracture morphology of vent pipe(Li Jing,2012) fracture macroscopically was observed as shown in figure 1, 2 and 3. Adjacent to the fracture outer wall of the pipe, there was an obvious scratche, along the pipe circumferential direction, the distance was about 8m from the fracture, circumferential length was about 32mm, width was about 6mm, the depth was about 2mm, as shown in figure 2. The fracture of pipeline was obvious out of roundness, no similar phenomenon found in other parts of the pipe. It was measured and calculated, the fracture non-circularity was about 16.9%. In addition, about 1/3 section was new fracture, and the remaining section was old fracture measured by sight, as shown in figure 3.(Wang Hongxi,2012)