

Fatigue Life Estimation of Spiral Welded Waterworks Pipelines

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Abstract : Recently, the welding is widely used in modern industry for joining the structures. However, the waterworks pipes are exposed to the fatigue load by cars, earthquake and etc because of being buried underground. Moreover, the residual stress exists in weld zone by welding process and it is well known that the fatigue life of welded structures is degraded by residual stress. Due to such reasons, the crack can occur in the weld zone of pipeline. In this case, The ground subsidence or sinkhole can occur, if the soil and sand are washed down by fluid leaked from the crack of water pipe. These problems can lead to property damage and endangering lives. For these reasons, the estimation of fatigue characteristics for water pipeline weld zone is needed. Therefore, in this study, for fatigue characteristics estimation of spiral welded waterworks pipe, ASTM standard specimens and Curved Plate specimens were collected from the spiral welded waterworks pipe and the fatigue tests were performed. The S-N curves of each specimen were estimated, and then the fatigue life of weldment Curved Plate specimen was predicted by theoretical and analytical methods. After that, the weldment Curved Plate specimens were collected from the pipe and verification fatigue tests were performed. Finally, it was verified that the predicted S-N curve of weldment Curved Plate specimen was good agreement with fatigue test data.

Keywords : spiral welded pipe, prediction fatigue life, endurance limit modifying factors, residual stress

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