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Investigation of Cracks Found in the Circumferential Direction on Jacking Pipes

Abstract:

In the urban area which TEPCO Power Grid supplies electricity, pipes and tunnels are buried underground for electric power cable accommodation. Since the urban area is teeming with traffic, these tunnels are constructed utilizing trenchless technology such as pipejacking from the view of avoiding traffic congestion. During the construction of a tunnel by pipejacking in Kanagawa prefecture, some cracks occurred on pipes. This pipe was about 500 m in length and 900 mm in diameter, including a sharp curvature of 60 m radius. These cracks were mainly found in the circumferential direction, where the curved sections were.

To investigate the causes of these cracks, the following procedure was taken: (1) find similar cases in the past; (2) clarify the characteristics of these projects; (3) interview the pipe manufactures and contractors; (4) list up the possible causes of cracks; (5) narrow down the causes of cracks by testings; (6) determine the cause of cracks.

In order to identify the cause of cracks, experiments using a full-scale model and numerical analysis were conducted to reproduce actual phenomena. This report also includes measures for preventing the same kind of trouble.