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Pipe-filling method for stabilizing empty ducts from the manhole

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Abstract:

A mortar filling technology by a robot from the inside of the existing manhole (L2.3 m × W1.3 m × H1.5 m) was developed, to reinforce an RC pipe cost-effectively. This technology was applied to an actual job site in the first quarter of 2019.

Telecommunication ducts are for storing and protecting cables, and in places where the ground condition is soft or needs special care, these ducts are laid inside an RC pipe (ducts occupies approx. 15% of the RC cross-section). At the time of the installation, which was some 40 years ago, the demand for telecommunication network was high and thus the RC pipe was installed with empty spaces for future duct installation. However, as time passes, the size of the cable was downsized with high-capacity, lowering the demand for further duct installation. Furthermore, due to the aging of the RC pipes, the utility-owner decided to fill the empty spaces with mortar, in order to stabilize the ducts/pipes permanently.

The key points of the technology to achieve this purpose are as follows: 1) A hole is drilled to an existing duct (dia.75 mm) for mortar injection, 2) anti-washout mortar was developed to enable filling, even with a presence of water, 3) a method to confirm the airtightness, 4) a method for visual recognition of the work process.

By using this technology, a telecommunication facility can be maintained safely and cost effectively with less environmental disruption.