

## 2. Development of Underground Joint Method of Divergence Confluence Part in Road Tunnel

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Recently, the application of the shield tunneling to the road tunnel has spread. In the road tunnel, the emergency parking belt and the lamp tunnel divergence confluence part, etc. is needed. The cut and cover tunneling method have generally constructed the divergence confluence part in the lamp tunnel. However, there are the problems in this method that the construction is difficult and the effect to the environment is big.

On the other hand, the method of connecting the lamp tunnel in the underground is proposed. However, because the ground improvement becomes large-scale in these methods, an increase in the cost of construction and the period becomes a problem.

In order to cope with these problems, "Underground joint method of divergence confluence part by CV widening method" was developed as a new underground joint method. This method connects the divergence confluence parts by cutting the main line tunnel where the early construction was done directly with the CV widening shield machine. This method has the merit of decrease of the amount of the digging soil and supplementary construction in the joint part a small range.

In this report, the author reports an outline of new underground joint method, examination of lining structure, outline of CV widening method and tail-seal performance confirmation experiment for a continuous widening.

**Key words** : road tunnel, shield tunneling, divergence confluence, underground joint method, consecutive tunnel widening