Train Car Yard Plan for Minatomirai Directly under Harbor View Park

Kazuyuki TAKAGI / Yuta IMATOMI
►Project Development Office, YOKOHAMA MINATOMIRAI RAILWAY COMPANY:
Daisuke ONOZUKA / Yusuke MATSUZAKI
►KAJIMA CORPORATION, TOA CORPORATION and Nara Construction Co,Ltd, Joint ventwre

1. Outline

This construction project is to build, at a site beyond the terminal station of the Minatomirai 21 Line, a railway facility (train car yard) by a mountain tunneling method for placing train cars owned by Yokohama Minatomirai Railway Company.
As shown in Figure-1, the train car yard is 590m tunnel consisting of three cross-sections of a single line, a double line, and a parallel line. The single line section is a glasses-shaped twin tunnel, which can accommodate single train car, connected to the terminal station. The double line section has a large cross-section as rails are laid for trains to intersect. The parallel section is a glasses-shaped twin tunnel serves as train car yards, each of them can accommodate two train cars. There is a rugged tourist area, surrounded by residential area with 20m-30m earth covering, directly above the train car yards. Therefore, this tunnel construction by mountain tunneling method is conducted under very restrictive conditions.

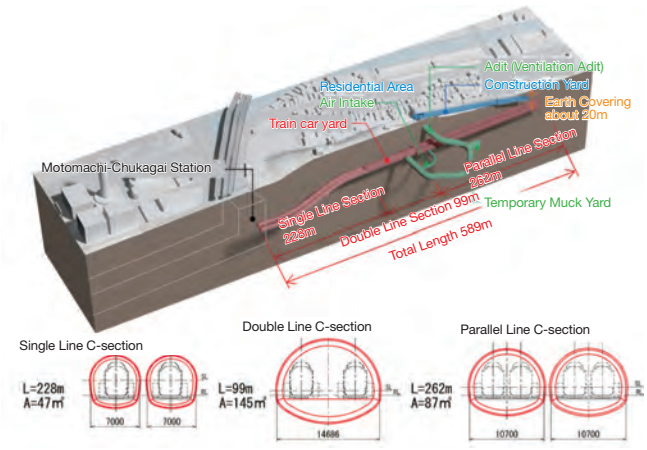

Fig. 1 Perspective Drawing of Train Car Yard

2. Ordering Method for This Construction Project

This construction project required a detailed design that would not delay the start of service in 2030 and would allow construction of train car yards within the project budget. Therefore, an ordering method (ECI method) was adopted to reflect the advanced technology and opinions of the constructor in the detailed design. In the ordering method generally practiced in Japan, the project owner conducts the survey and design through the designer, the constructor determines the costs and receives the construction order. In the ECI method, on the other hand, the owner contracts with the constructor from the design stage, and the contract is awarded to the constructor when both parties agree on the amount of construction work based on the design reflecting the constructor's knowledge and technology. In this project, the ECI method was adopted because there was not enough time to investigate the construction conditions and to design the structural form, etc., and it was necessary to aim for early launch of operation of the train car yards. The conceptual diagram of the process is shown in Figure-2.

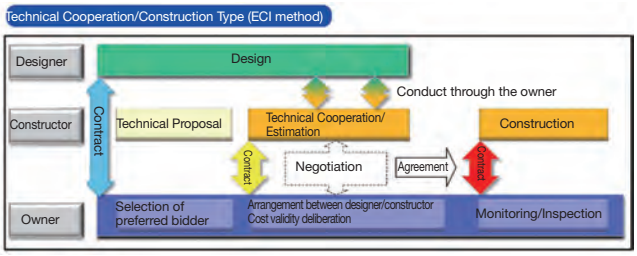

Fig. 2 Conceptual Diagram of Technical Cooperation and Construction Type (ECI Method)

3. Detailed Design by ECI Method

The following are major case examples in which, by the ECI method, the contractor changed the design from the basic design in terms of economy, shortening of construction period, impact on the surrounding environment, and other factors.
The parallel cross-section was planned as a glasses-shaped twin tunnel with a center shaft in which a center pillar is constructed after excavating the center shaft was excavated, but as shown in Figure-3, the construction period and construction cost were reduced by changing to close-set parallel tunnels without a center pillar.
Also, in the initial plan, as a path to connect to the train car yard during the construction, a circular shaft and an adit were included. However, since it requires earth retaining and excavation of construction yard in the vicinity of residential area, it was considered that the impact on surrounding environment was large. Thus, the plan was changed to connect to the double track section by a spiral adit, which would shorten the process and minimize the impact on the surrounding environment.
By applying the ECI method, a reasonable plan/design have been implemented considering the risk of process. Excavation of the tunnel for this project began in May 2023, and the adit is currently being excavated. During excavation, the impact on the surrounding environment, such as by measuring ground surface subsidence, would be properly assessing.

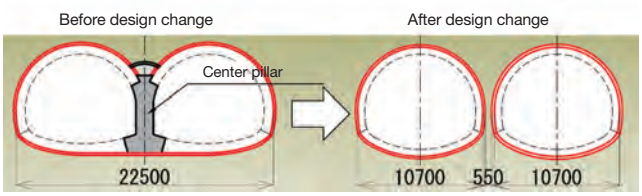

Fig. 3 Parallel Section after Design Change

4. Contact

Official Webpage of YOKOHAMA MINATOMIRAI RAILWAY COMPANY
https://www.mm21railway.co.jp/info/news/2022/05/post-120.html
TEL：045-319-4056
* Currently belongs to Yokohama City Transportation Bureau