

## URT工法を用いて国道16号交差部に大断面トンネルを構築

—中央新幹線 神奈川県駅(仮称)—

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中央新幹線神奈川県駅(仮称)(以下、「県駅」)は中間駅唯一の地下駅で、2019年11月に工事の安全祈願・起工式を執り行い中央新幹線の中間駅として初めて土木工事に着手した。県駅は、相模原市緑区のJR東日本、京王電鉄が乗り入れる橋本駅に近接しており、県駅の西端部は国道16号と交差している。本稿では、県駅の計画概要、計画の変更に至った経緯を説明したうえで、国道16号と交差するURT工法を用いた大断面トンネルの計画、施工について紹介する。URT工法を用いたトンネルとしては延長65m、断面積250m<sup>2</sup>と最大級のものであり、施工にあたっての課題、それに対する対応方法、施工実績をまとめたものである。

**Building a Large-Section Tunnel beneath the National Route 16 Using the URT Method —The Chuo Shinkansen, the Kanagawa-Ken Station (Tentative Name) —****By Saori Sasaki, Central Japan Railway Company**

The Kanagawa-ken Station (tentative name) on the Chuo Shinkansen (hereafter “Ken Station”) is the only underground intermediate station. In November 2019, a ceremony was held to pray for the safety of the construction and to start the civil engineering works for the first intermediate station of the Chuo Shinkansen. The Ken Station is located near Hashimoto Station, which is served by JR East and Keio Electric Railway, in Midori Ward, Sagami-hara City. The western end of the Ken Station is under National Route 16. In this paper, the authors describe the outline of the plan for the Ken Station, the circumstances that led to the change in the plan, and then introduce the planning and construction of a large-section tunnel that was installed under the National Route 16 using the URT method. The tunnel is one of the largest tunnels constructed using the URT method, with a length of 65 m and a cross-sectional area of 250 m<sup>2</sup>. The authors summarized the challenges faced during construction, the methods used to address these challenges, and construction results.

## JR東北本線下掘削における列車への影響を低減する補助工法の検討

—国道13号福島西道路 (仮称)浅川トンネル—

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国土交通省福島河川国道事務所(以下、「国交省」)では、福島市中心部の道路交通集中の緩和を目的とし、国道13号福島西道路の延伸を進めている。このうち、JR東北本線金谷川・南福島間では、鉄道下を上下線2本のトンネルを山岳工法により横断するが、JR東日本が補助工法の設計・施工を受託し、国交省がトンネル本体を新設する計画である。本工事では、とくに鉄道と道路の交差箇所、最小土かぶり7.9mと山岳トンネルとしては非常に小さく、トンネル施工時の鉄道運行への影響が懸念されたことから、補助工法としてパイプルーフおよび長尺鋼管先受け工法を採用した。本稿では、補助工法の選定において、列車運行への影響を低減させることを目的として実施した数値解析などを用いた検討について報告する。

**Study of Auxiliary Methods to Reduce the Impact on Train Operation during Excavation under the JR Tohoku Main Line****—The National Route 13, Fukushima Nishi Road, the Asakawa Tunnel (Tentative name) —****By Fumiyuki Maruko, East Japan Railway Company**

The Fukushima Office of Rivers and National Highways of the Ministry of Land, Infrastructure, Transport and Tourism (hereinafter referred to as “MLIT”) has been promoting the extension of the National Route 13, Fukushima Nishi Road, to ease the concentration of road traffic in the center of Fukushima City. This project involves the tunneling of two tunnels as inbound lanes and outbound lanes using the conventional method, they pass under the JR Tohoku Main Line between Kanayagawa and Minami Fukushima. JR East has been contracted to design and construct the auxiliary methods, while MLIT plans to build the main tunnel. In this project, the minimum covering is 7.9 m, which is very small for conventional tunneling, especially beneath the railway tracks, and there were concerns about the impact on railway operations during tunneling works, so pipe roofing and forepiling methods were adopted as auxiliary methods. In this paper, the authors report on the study conducted using numerical analysis and other methods to select auxiliary methods and reduce the impact on train operations.

不破原トンネル工事は、高知県西部に位置する国道56号窪川佐賀道路の一部として建設する延長1,831mのトンネルである。当初設計では、片側に大規模な切土が生じることやトンネル上部に転石が存在していたことなどの要因から、坑口付けに伴う掘削を最小限に収めることや将来的な維持管理性の向上を目的として、地形に配慮した斜坑門への計画変更を行った。また、トンネル中間部に位置する小土かぶり部では、地質が明確になっていないことや、トンネル掘削に起因する沢水の枯渇による近隣住民への影響が懸念された。そのため、トンネル坑内から詳細な地質調査を実施するとともに、先行変位の抑制と減水効果を図るための特殊な先受け工法を実施した。本稿では、これらの施工実績や施工上の工夫について報告する。

### Installing a Skew Portal on a Steep Slope and Tunneling Using the Special Forepiling Method Directly under a Stream

—The National Route 56, the Kubokawa-Saga Road, the Fubahara Tunnel—

By Masahisa Hashida, Ministry of Land, Infrastructure, Transport and Tourism

The Fubahara Tunnel project is to build a 1,831-m-long tunnel being constructed as part of the Kubokawa-Saga Road, the National Route 56, located in western Kochi Prefecture. Since a large cutting was made on one side and a tunnel portal was installed below boulders in the original design, the plan was changed to a skew portal that took the topography into consideration to minimize the cutting required for the portal and improve future maintenance. In addition, the geology of the shallow area in the middle of the tunnel was not well defined, and there were concerns about the impact on nearby residents due to the depletion of stream water caused by the tunnel excavation. Therefore, a detailed geological survey was conducted from inside the tunnel, and a special forepiling method was implemented to suppress preceding displacement and reduce water flow. In this paper, the authors report on the construction results and construction innovations.

供用から約40年経過した矢板工法で建設された延長約600mの高速道路トンネル内において火災が発生した。トンネル内火災は、火災発生から鎮火まで40時間以上を要する近年例を見ないトンネル内火災となった。高速道路は、約3か月強の間、本線通行止めを行い、トンネル施設の復旧に取り組んだ。本稿では、トンネル施設の復旧のうち、主に覆工コンクリートの復旧対策(調査、設計、施工)について報告する。

### Initiatives on Restoration Methods for Fire-Damaged Mountain Tunnels

—Example of a Fire Extinguished after 40 Hours—

By Yasunori Kobayashi, West Nippon Expressway Company Limited

A fire occurred in a 600-m-long expressway tunnel constructed by timbering support method, which had been in service for about 40 years. The fire in the tunnel was unprecedented in recent years, requiring more than 40 hours from the onset of the fire to its extinguishment. The main lanes of the expressway were closed to traffic for a little over three months while works were done to restore the tunnel facilities. In this paper, the authors report on the restoration of tunnel facilities, focusing mainly on restoration measures (survey, design, and construction) for the concrete of lining.

第50回国際トンネル協会(ITA)の総会が、2024年4月19～25日に中国の深圳において開催された。また、併催された世界トンネル会議(WTC)は、「Tunnelling for a Better Life」のテーマのもとで対面・オンラインと併せて約3,000名が参加した。本稿では、ITA総会およびWTCにおける内容のうち、ITAの全体的な動向およびWGなどの活動の概要を報告する。

### **50th ITA General Assembly and World Tunnel Congress (Shenzhen) Report By Japan Tunnelling Association**

The International Tunnelling and Underground Space Association (ITA-AITES) held its 50th meeting in Shenzhen, China from 19th to 25th April 2024. The World Tunnel Congress (WTC) 2023 which was held in conjunction with the meeting had more than 3,000 participants including those attending online with the theme of “Tunnelling for a Better Life” for 3 days from 15th May. This report outlines overall ITA trends and technical activities of Working Groups at the ITA General Assembly and the WTC.