

建設現場では東京オリンピックの開催準備や度重なる自然災害の影響により労働者が不足しており、さらに将来労働者人口の減少が予想されていることから、働き方改革の推進や生産性向上が急務となっている。新東名高速道路谷ヶ山トンネル(仮称)は、神奈川県と静岡県の県境を東西に跨ぐ、上り線2,793m、下り線2,789mの山岳トンネルである。本工事は、このうち西側を掘削する工事で、河川直下を小土かぶりで通過する箇所や神縄断層と交差する箇所があり、施工が困難となることが想定されていた。静岡県側は、脆弱な未固結土砂堆積物が主体であり、切羽安定対策が計画されており工期遅延のリスク低減が課題であった。本稿では、各種技術の導入やさまざまな工夫により生産性向上に取組み、高速道路のトンネル工事において初めて完全週休2日を実施した事例について報告する。

## A Productivity Improvement Implementing a Five-Day Workweek Tunneling Works Under Shallow Overburden and Unconsolidated Ground

—The Shin-Tomei Expressway, the Yagayama Tunnel, West Lot—

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There is a shortage of workers at construction sites due to preparations for the hosting of the Tokyo 2020 Olympic Games and consequences of repeated natural disasters. Since the number of workers is expected to decrease in the future, there is an urgent need to promote work style reforms and improve productivity. The Yagayama Tunnel (tentative name) on the Shin-Tomei Expressway is a mountain tunnel that straddles the border between Kanagawa prefecture and Shizuoka prefecture in an east-west direction. The length of the in-bound tube is 2,793 m, and the length of the out-bound tube is 2,789 m. This lot was to build the west side of the tunnel, which was expected to be difficult because the tunnel had to be excavated under the small overburden directly under the river and intersect with the Kan-nawa fault. On the Shizuoka Prefecture side, measures for face stabilization were planned mainly for fragile unconsolidated sediment deposits and reducing the risk of construction delays was an issue. In this paper authors report on a case in which a five-day workweek operation was implemented for the first time in highway tunneling project by introducing various technologies and efforts to improve productivity.

相鉄・東急直通線の羽沢トンネルは、神奈川東部方面線の一部として相鉄・JR直通線の羽沢横浜国大駅から新横浜(仮称)駅までを結ぶ延長約3,500mの複線トンネルである。羽沢横浜国大駅方から約150mが開削トンネル、約3,350mがトンネル外径10.4mの泥土圧シールドによる円形トンネルとなっている。到達部付近には主要地方道環状2号線の新横浜陸橋基礎の至近を通過する区間がある。新横浜陸橋の交通量を考慮すると、トンネルの施工により陸橋に大きな変状が生じた場合、社会に波及する影響も多大なものとなるおそれがあることから、当該区間を施工するにあたっては事前に対策の検討を行った。本稿では、幹線道路陸橋と近接してシールドトンネルを施工する際の検討事項および施工計画と結果について報告する。

### A Shield Tunneling Directly Under a Highway Overpass

#### —The Sotetsu-Tokyu Through Railway, the Hazawa Tunnel—

By Shutaro Mochizuki, Japan Railway, Construction, Transport and Technology Agency

The Hazawa Tunnel on the Sotetsu-Tokyu through railway is a 3,500 m long double-track tunnel that connects Hazawa Yokohama-Kokudai Station and Shin-Yokohama Station (tentative name) on the Sotetsu-JR through railway which is a part of the Kanagawa Tobu Homen Line. The tunnel runs as a cut-and-cover tunnel for about 150 m from the Hazawa Yokohama-Kokudai Station, and then for about 3,350 m as a circular tunnel constructed using an EPB shield TBM with an outer diameter of 10.4 m. A part of the tunnel near the arrival section passes very close to the foundation of the Shin-Yokohama overpass on the Yokohama city road Kanjo 2-gosen. Considering the volume of traffic on the Shin-Yokohama overpass, severely damaging the overpass during the tunnel construction could have a significant impact on society. Therefore, measures were considered in advance before the construction of the section. In this paper we report on the study items, construction plan and results of the shield tunneling in close proximity to the highway overpass.

東京都下水道局が整備する「台東区松が谷二丁目主要枝線」は、下水道管の老朽化対策にあわせて、対象流域の雨水排除能力の向上を目的とする再構築事業を推進するために布設するものである。本主要枝線は、2地点で急曲線の施工が必要な線形であるとともに、狭小な発進基地用地での施工や、東京電力人孔との近接施工、到達部の供用中既設人孔内での安全な施工が課題となった。本稿では、このような課題の具体的内容や、それらに対する対策として採用した工法、施工上の工夫などについて詳述する。

### Construction of Sewer Tunnel With Steep Curves Using Dual Shield TBM Which Started From a Narrow Base and Arrived at an in-Service Manhole

#### —The Tokyo Sewerage, the Matsugaya 2-Chome, Taito City Main Branch Sewer—

By Yasuhiro Teramatsu, Tokyo Metropolitan Government

The Tokyo Metropolitan Government Bureau of Sewerage is installing the “Matsugaya 2-chome Taito city Main Branch Sewer” to promote the reconstruction project for the purpose of improving the rainwater drainage capacity of the drainage basin and to take measures against aging sewer pipes. The main branch sewer required construction of steep curves at two points. The starting section of the sewer had to be constructed in a narrow base and in close proximity to a TEPCO manhole. The arrival section had to be constructed in a safe manner in an existing manhole in service. In this paper authors provide detailed description of these issues, report on the adopted construction methods and efforts in the construction.

施工

## 標高2,000mの国立公園特別保護地区内に矢板工法でトンネルを施工

—甚之助谷地すべり対策排水トンネル—

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甚之助谷地すべり排水トンネル工事は、石川県白山市白峰内の白山国立公園内の標高約2,000mの場所に位置し、取水施設および排水トンネル386mを矢板工法で施工するものである。標高2,000m、国立公園内、豪雪地帯など、制約条件の多い環境下で、安全と品質を確保するために、施工機械の変更や覆工の一部にプレキャスト製品の採用を行って施工した。本稿では、山岳地帯、国立公園内という特殊条件下での施工における仮設備計画、施工状況、施工体制や作業員の日常生活について報告する。

**Construction of a Tunnel Using the Timbering Support Method in a Special Protection Area of a National Park at an Altitude of 2,000 Meters**

—Drainage Tunnel as a Measure Against the Jinnosuke-Dani Landslide—

**By Naotsugu Ebuchi, Ministry of Land, Infrastructure, Transport and Tourism**

Drainage tunnel project of The Jinnosuke-dani landslide is promoted at an altitude of about 2,000 m in Hakusan National Park in Hakusan City, Ishikawa Prefecture. The project includes the construction of a water intake facility and a 386-meter drainage tunnel using the timbering support method. In order to ensure the safety and quality of the construction in an environment with many restrictions, such as altitude of 2,000 m, a national park, and a heavy snowfall area, the construction machinery was changed, and precast products were used for some parts of the lining. In this paper, we report on the planning of temporary facilities, the construction status, the construction system, and the daily life of the workers in the construction under the special conditions of a mountainous area and a national park.