

磐越自動車道宝珠山トンネル工事は新潟県阿賀町と阿賀野市の境に位置し、三川IC～安田IC間の4車線化事業におけるⅡ期線トンネル工事である。このうち小松トンネルは、強風化花崗岩や崖錐堆積物といった未固結地山が主であったことから、上部送電鉄塔、坑口崖錐堆積物に施工されたグラウンドアンカーを有する斜面など、周辺構造物への影響が懸念される中で施工を行った。あらかじめ解析により影響予測を行い、各種計測により、施工に伴う地山および既設構造物をモニタリングしながら、その結果にもとづき補助工法の選定・変更を行った結果、周辺構造物への影響を軽減できたことについて報告する。

Tunnel Construction with a 20 m Clearance from an Overhead Power Transmission Tower

—Ban-Etsu Expressway, Houshu-San Tunnel, Komatsu Tunnel (Phase II Section) — By Yutaka Tateoka, East Nippon Expressway Company Limited

The Ban-Etsu Expressway Houshu-San Tunnel project is located on the border between Aga Town and Agano City in Niigata Prefecture. The project involves construction of the second tunnel as part of the four-lane expansion project between Mikawa IC and Yasuda IC. The Komatsu Tunnel, a part of this project, was excavated mainly in unconsolidated ground consisting of highly weathered granite and talus deposits. The construction proceeded amid concerns about potential impacts on nearby structures, including an overhead power transmission tower and a slope stabilized with ground anchors installed in the talus deposits near the tunnel portal. This paper reports how the impact on surrounding structures was mitigated by predicting potential effects through preliminary analysis, monitoring the surrounding ground and existing structures during construction using various measurement methods, and selecting or modifying auxiliary construction methods based on the results.

本稿は、長崎南環状線の一部で、延長2,137mの2車線道路トンネルである(仮称)江川トンネルの施工報告である。坑口が住宅密集エリアに位置する山岳トンネル工事で、騒音の影響範囲にある住宅との最小離隔が36mのため、防音ハウスなどにより厳重な騒音対策を行った。また、比較的硬質な長崎変成岩を主体とした地山の上部に住宅があり、トンネルを土かぶり30mで貫くため、昼間のみの機械掘削で振動対策を実施するとともに、数値解析による変位予測や計測監視強化で地表面沈下対策を実施した。さらに、総貯水容量28万 m^3 のダムとトンネルの最小離隔が30m程度のため、ダム水位を低く保持して掘削中の突発多量湧水を防止した。加えて、仮設ヤードが狭隘で、出入口は通学路や国道に面していたため、仮設備計画や安全管理に工夫を要した。このような市街地特有の施工条件下での施工について記述する。

Safe Construction of a Mountain Tunnel in a Densely Populated Residential Area —Nagasaki South Ring Road, Egawa Tunnel—

By Takaaki Koide, Construction Work Joint Venture of Arsocia (Former Sumitomo Mitsui), Komiya and Masuyama

This paper reports on the construction of the Egawa Tunnel (tentative name), a 2,137 m-long, two-lane road tunnel forming part of the Nagasaki South Ring Road. Because the portal of this mountain tunnel is located in a densely populated residential area, with a minimum distance of only 36 m from houses within the noise-affected area, strict noise control measures were implemented, including the installation of a soundproof enclosure. In addition, since the tunnel was to be excavated under residential buildings with an overburden of only 30 m in the ground consisting mainly of relatively hard Nagasaki metamorphic rock, vibration control measures were implemented by limiting mechanical excavation to daytime hours. Measures to prevent ground surface settlement were also implemented through prediction of ground displacement using numerical analysis and through enhanced monitoring. Furthermore, because the minimum distance between the tunnel and a dam with a total storage capacity of 280,000 m^3 is approximately 30 m, the dam water level was kept low to prevent sudden large volume water inflows during excavation. In addition, the temporary construction yard was severely constrained in area, and its exits faced both a school route and a national highway, requiring careful planning of temporary facilities and special attention to safety management. This paper describes the construction methods and measures adopted under these conditions specific to urban areas.

解説

開業から38年を経た青函トンネルの防災システムの更新

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鉄道・運輸機構 小原 雄一

青函トンネルは総延長53km850mのうち23km300mが海底区間となる長大海底トンネルであり、本州と北海道を結ぶ重要な交通インフラである。トンネル最深部は海面下約240mに位置し、高い水圧下で海水を絶えず排水しなければならないきわめて特殊な環境にある。そのため開業当初より湧水計や覆工ひずみ計、地震計などを用いた各種防災システムが整備され、列車の安全な運行を支えてきた。本稿では、青函トンネルにおける現在の防災システムの概要を示すとともに、開業から38年が経過した設備の更新に伴い、湧水計および覆工ひずみ計の高性能化、通信ネットワークの光回線化など、機能向上に向けた取り組みについて紹介する

Renewal of Seikan Tunnel Disaster Prevention System 38 Years After Opening**By Yuichi Kobara, Japan Railway Construction, Transport and Technology Agency**

The Seikan Tunnel is a long undersea tunnel with a total length of 53.850 km, of which 23.300 km runs beneath the seabed. It serves as a vital transportation link between Honshu and Hokkaido. The deepest section of the tunnel lies approximately 240 m below sea level, creating an extremely unusual environment in which water inflow must be continuously drained under high water pressure. For this reason, various disaster prevention systems incorporating instruments such as water inflow meters, lining strain gauges, and seismometers have been in place since the tunnel's opening, supporting the safe operation of trains. This paper provides an overview of the current disaster prevention system in the Seikan Tunnel and describes initiatives to enhance its functionality in conjunction with the renewal of equipment after 38 years of operation. These improvements include upgrading the performance of water inflow meters and lining strain gauges, as well as converting the communication network to fiber-optic lines.

報告

第52回ITA総会および世界トンネル会議(モントリオール)報告

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(一社)日本トンネル技術協会

第52回国際トンネル協会(ITA)の総会が、2026年5月16~21日にカナダのモントリオール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)では、「Connecting Communities Through Underground Infrastructure」のテーマで対面を主流としたハイブリットで約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などの活動概要を報告する。

52nd ITA General Assembly and World Tunnel Congress (Montreal) Report**By Japan Tunnelling Association**

The International Tunnelling and Underground Space Association (ITA-AITES) held its 52nd meeting in Montreal, Canada, from May 16 to 21, 2026. The World Tunnel Congress (WTC), held concurrently, took place under the theme of "Connecting Communities Through Underground Infrastructure" and was a hybrid event with a focus on face-to-face interaction, attracting approximately 3,000 participants. This report outlines overall ITA trends and the technical activities of the Working Groups at the ITA General Assembly and the WTC.