

**SYAMA TUNNEL – LONGEST ROAD TUNNEL IN JAMMU KASHMIR
ON THE LOWER HIMALAYAN RANGE**

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Abstract:

Syama tunnel is India's longest highway tunnel, on the Jammu-Srinagar national highway. Syamaprasad Mookerjee Tunnel also known as Syama Tunnel and formerly known as the Chenani-Nashri Tunnel. It is a road tunnel in the Indian union territory of Jammu and Kashmir on NH44. The work was started in 2011 and was inaugurated by Prime Minister Narendra Modi on April 2nd 2017. It is India's longest road tunnel with a length of 9.28 km. It is the first tunnel in India with a fully integrated tunnel control system. The tunnel reduces the distance between Jammu and Srinagar by 30 km and travel time by two hours. The all-weather tunnel bypasses snowfall and avalanche prone areas in winter at places like Patnitop, Kud and Batote that obstruct NH44 every winter and cause long queues of vehicles sometimes for days at length. This will be a boost to the state's economy as it will promote trade and tourism

Keywords: Syama Tunnel, Jammu Kashmir, Himalayan range.

Introduction

Jammu and Kashmir is a region administered by India as a union territory and constituting the southern portion of the larger Kashmir region. It lies in the north of the Indian states of Himachal Pradesh and Punjab and to the west of Ladakh. This contained within the Jammu and Kashmir Reorganization Act, 2019 which was passed by both houses of

the Parliament of India in August 2019. The act re-constituted the erstwhile state of Jammu and Kashmir as two union territories, 'Jammu and Kashmir' and 'Ladakh', with effect from 31 October 2019. Improved road access is fundamental to the current drive for economic development and livelihood improvement in many parts of the Himalayas. There is a history of over one hundred years of road building in the region and an expanding road network that faces serious challenges to its sustainability. Roads are the mirror of all development of a nation. A tunnel is an underground passage way, dug through the surrounding soil and rock and enclosed except for entrance and exit, commonly at each end. A pipeline is not a tunnel, though some recent tunnels have used immersed tube construction techniques rather than traditional tunnel boring methods.

Location of the Syama Tunnel

The Syama tunnel is located on the lower Himalayan range at an altitude of 1,200 m (3,937 ft). The southern portal of the tunnel is at 33.0463°N 75.2793°E and the northern portal (of the tunnel is at coordinate's 33.1285°N 75.2928°E. The tunnel has been excavated starting from about 2 km from Chenani town south of Patnitop to Nashri village North of Patnitop. It is formerly known as Chenani –Nashri tunnel.

Advanced road tunnel

The purpose of the tunnel is to facilitate all-weather transit since the road is closed for an average of 40 days in winter. The tunnel is India's first and the world's sixth road tunnel with a transverse ventilation system. High-power drives and motors run the ventilation system with specialized safety software. Sterling & Wilson Ltd. designed and installed a two-tier illumination system, which will be operational around the clock, 365 days a year. To ensure

smooth travel and safety of commuters, a low-harmonics, variable-speed-drive ventilation system was designed. The VSDs (Variable Speed Drives) and motors are installed at the north (Nashri) and south (Chenani) portals for air supply and exhaust. These VSDs also are equipped with in-built redundancy to ensure minimum downtime. The tunnel's safety controls are designed to effectively mitigate any fire emergencies. To prevent diminution of vision because of changes in the light while going in or coming out of the tunnel, the lighting inside has been adjusted at a gradient of luminous strength. This is one of the most advanced road tunnels built in the country, surmounting challenges of terrain and distance.

Construction

The Syama or Chenani-Nashri tunnel is part of a National Highway Authority of India project along the National Highway 44. The foundation was laid for the project in July 2011 by the then Jammu and Kashmir Chief Minister Omar Abdulla and Union Health Minister Ghulam Nabi Azad under the ruling UPA government. The original estimate to build this two-lane tunnel was Rs.2,520 crore, but escalated to a total of Rs.3,720 crore. The scheduled date of completion for the project was May 2016. The project was getting delayed due to bad weather conditions and snowfall on the highway, which snapped the electricity supply to the area and so the executing agency was unable to continue with the required testing and inspection processes. The tunnel was inaugurated by the Prime Minister Narendra Modi on 2 April 2017. The construction involved nearly 1,500 engineers, geologists and labourers, besides skilled workers. The National Highways Authority of India has spent Rs.3, 720 crore on the project.

Features

Syama tunnel comprises two tubes that run parallel to each other. The main traffic tunnel is of diameter 13 m and a separate safety or escape tunnel of diameter 6 m is alongside. The two tubes each of approximately 9 km long and are connected by 29 cross passages at regular intervals for every 300 meters along the entire length of the tunnel. Since such a long tunnel could present the problem of a lack of oxygen, to ensure that there is no excessive carbon-dioxide build-up inside, there are several exhaust meters to check the air throughout the length of the tunnel. With inlets, every 8 meters, bringing fresh air into the main tube, and exhaust outlets every 100 m opening into the escape tube, the tunnel is the country's first and the world's sixth road tunnel with a transverse ventilation system. Transverse ventilation will keep tailpipe smoke inside the tunnel at a minimum level in order to prevent suffocation and keep visibility at acceptable levels, especially since the tunnel is so long. The 29 cross passages between the two tunnels will be used to evacuate, through the escape tunnel, a user who might be in distress or to tow away any vehicle that might have broken down in the main tunnel. A total of 124 cameras and a linear heat detection system inside the tunnel will alert the Integrated Tunnel Control Room (ITCR) located outside the tunnel. In the case of a traffic violation, the Control Room informs the traffic police deployed outside the tunnel, who shall impose a fine on errant drivers on the spot.

SOS (Save Our Ship) boxes installed every 150 m will act as emergency hotlines for commuters in distress. To connect to the ITCR (Integrated Tunnel Control Room) to seek help, one should only need to open the door of the SOS box and say 'Hello', Commuters can use their mobile phones inside the tunnel. The tunnel is built with fire safety measures. As soon as sensors detect fire, a safety protocol will kick in, and the pushing of fresh air will stop and only exhausts

will function. Longitudinal exhaust fans installed at regular intervals will concentrate on 300 m on either side of the fire, pushing the smoke upward. Ambulances or vehicles carrying foam will rush through the escape tunnel to evacuate commuters and fight the fire.

The heat detection system inside the tunnel will record rises in temperature in the tunnel, the result of excessive emissions which may be caused by one or more vehicles. In such cases, the ITCR will get in touch with staff inside the tunnel, and the offending vehicle will be pulled over into a lay-by and subsequently removed by a crane through the parallel escape tunnel. The tunnel is located at an altitude of nearly 4,000 feet in difficult Himalayan terrain. The distance between Chenani and Nashri and hence between Jammu and Srinagar is reduced by 30 km and travel time is cut by two hours. The tunnel bypasses 44 avalanche and landslide-prone spots on the highway. It is an 'all-weather' tunnel and enables an increase in trade and tourism in the state. The tunnel also has parking spots in case of vehicle breakdowns.

Conclusion

From the tunneling perspective, the Himalayas arguably pose the most challenging ground conditions almost anywhere in the world. One of the prime reasons is that they are the youngest of the mountain chains and are demonstrably rising faster than anywhere else. It will reduce travel distance between Jammu and Srinagar by 30.11 km, which will help save fuel worth Rs 27 lakh daily. Built on the lower Himalayan range at a height of 1,200 metres, it will cut travel time between the two cities by at least two hours. It is part of a 286-km-long four-lane project on the Jammu-Srinagar highway. It is meant to avoid stretches of National Highway 44 prone to avalanches and landslides. Patnitop, Kud, and Batote will be bypassed now. The speed limit in the tunnel will be 50km/hour and headlights will have to be low beam. This tunnel is for solving communication problem in mountains areas.

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