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**Headline: Robbins Double Shield Takes on Nepal’s First TBM Project for Bheri Babai**

*Sub-Headline: Irrigation and Hydroelectric Project to Ease Food Crisis in Mid-Western Region of Nepal*

Nepal will welcome its first TBM ever this summer, a 5.06 m (16.6 ft) diameter Double Shield machine for the Bheri Babai Diversion Multipurpose Project (BBDMP). The Robbins TBM underwent its Factory Acceptance Testing in July 2017 and is currently being shipped to the jobsite in the Siwalik Range, part of the Southern Himalayan Mountains. Pre-construction, including laying gravel onto rural roads and excavating wells for drinking water, has been completed to make way for the TBM and its impending launch.

The BBDMP is one of Nepal’s 11 National Pride Projects--prioritized plans sanctioned by the Government of Nepal to further develop the mainly rural country. This project will irrigate 60,000 hectares (almost 15,000 acres) of land in the southern region of Nepal, benefitting an estimated 30,000 households. It will divert 40 cubic meters of water (1,400 cubic feet) per second from Bheri River to Babai River under a head of 150 m (492 ft) using a 15 m (49 ft) tall dam, providing year-round irrigation in the surrounding Banke and Bardia districts. The water will also be used for hydroelectricity, with a generating capacity of 48 MW benefiting the country with NPR 2 billion (20 million USD) annually.

Contractor China Overseas Engineering Group Co. Ltd. Nepal Branch (COVEC Nepal Branch), represented by China Railway No.2 Engineering Co., Ltd Chengtong Branch, is responsible for the headrace tunnel and is aware of the challenges associated with tunneling in tough geology. “The design of Robbins TBMs is good, and in particular Double Shield TBMs,” said Project Manager of BBDMP, Hu Tianran, for China Railway No.2 Engineering Co., Ltd Chengtong Branch. The Siwalik range is projected to consist of mainly sandstone, mudstone and conglomerate, requiring a TBM that can withstand squeezing ground, rock instability, possibly high ingress of water and fault zones. Maximum cover above the tunnel is 820 m (0.5 mi).

Due to the challenges in the young geology of the Himalayas, Difficult Ground Solutions (DGS) have been incorporated into the machine’s design. A stepped shield has been designed to move through squeezing ground. Robbins Project Engineer Missy Isaman talked about the DGS features incorporated into the TBM: “There is a probe drill in the rear that probes through the gripper shield in 14 places. We added ports in the forward shield for drilling too. There are eight ports around the circumference for hand drilling. There are also six ports in the top 100 degrees of the shield for forepoling.” She further noted that no equipment was ordered for either of the forward shield drilling options, but it’s easier to add the ports to the shield now, in case more comprehensive drilling is needed later in the bore. Other machine modifications included 35 mm (70 mm on the diameter) of possible overcut for gage cutters, and additional ports in the forward shield for dewatering.

Muck removal will be achieved by muck cars. Robbins will provide Field Service to support the machine erection, testing, commissioning and boring of the first 500 m (1,640 ft). The tunnel will be lined with hexagonal precast concrete segments.

The project owner, the Government of Nepal’s Ministry of Irrigation (MOI), has chosen a TBM over the traditional method of Drill &Blast due to the faster mobilization and rate of advance offered by mechanized mining. “The reason a TBM was chosen for this project was because using D&B method could have taken at least 12 years for project completion. This was due to there only being one excavation heading with no possibility of launching multiple operations using adit tunnels,” said Robbins General Manager for Nepal, Prajwal Man Shrestha. More generally, Mr. Shrestha saw the project as a way to prove that TBMs can indeed take on complex Himalayan rock. “Since the Himalayan range has a young geology and not much has been surveyed yet, the use of newer technology is looked upon with slight apprehension. The first few TBM projects and additional surveys will show how suitable TBM technology will be for the Himalayan Range.”

The success of the BBDMP, a national pride project, is paramount for the country as well as the TBM industry. It is expected to help aide the food crisis in the mid-western region of Nepal by increasing agricultural yields and invigorating socio-economic development in the region. The Robbins TBM for the 12.2 km (7.5 mi) tunnel is scheduled to launch in November 2017.

WORD COUNT: 729

Side bar or callout text:

**The News in Brief:**

* The Robbins Double Shield passed its Factory Acceptance Testing in July 2017.
* The 5.06 m (16.6 ft) diameter Robbins TBM was designed with specialized Difficult Ground Solutions (DGS) features.
* Nepal’s first TBM will bore a 12.2 km (7.5 mi) long tunnel through the Siwalik range that lies between Bheri and Babai Rivers.
* The TBM is expected to launch in November 2017.

Images Attached to Email. If you need a higher resolution image, please contact Desiree Willis.

Captions for Images:

**Image 1:** The 5.06 m (16.6 ft) diameter Double Shield TBM will bore a 12.2 km tunnel from the Bheri River to Babai River.

**Image 2:** Due to the geological challenges in the Himalayas, DGS features have been added to the machine including a stepped shield, and dozens of ports throughout the front, rear and around the circumference of the machine.

**Image 3:**. Mr. Saroj Chandra Pandit, Deputy Director General of  DOI (Department of Irrigation) speaking at the Factory Acceptance Testing. Other speakers included Mr. Lin Qiang, Deputy Manager of China Railway No. 2 Engineering Co., Ltd and Mike Kolenich from Robbins.

**Image 4:** The Robbins crew, contractor COVEC Nepal Branch, and project officials stand proudly in front of the Robbins Double Shield TBM that will tackle the challenging geology in the Himalayas.

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