

FOR IMMEDIATE RELEASE

*Date: March 21, 2018*

**Headline: Robbins TBM uncovers Spectacular Cavern at Galerie des Janots**

*Sub-Headline: Workhorse Machine makes progress in Difficult Ground*

A rebuilt Robbins 3.5 m (11.5 ft) diameter Main Beam TBM has yet another milestone to add to its storied career: an unexpected cavern, encountered and successfully passed through.

Contractor Eiffage Civil Engineering is operating the machine, which launched in 2017 for the Galerie des Janots project in La Ciotat, France. The cavern, studded with stalactites and stalagmites and measuring 8,000 cubic meters (283,000 cubic ft) in size, was grazed on the tunneling operation’s left side. The crew named the cavern “grotte Marie Lesimple” after their site geologist.

“We hit the corner of it. To cross it, we had to erect a 4 m (13 ft) high wall of concrete so the TBM would have something to grip against,” explained Marc Dhiersat, Project Director of Galerie des Janots for Eiffage. A small door allowed access inside the cavity, which formed naturally at a point 60 m (200 ft) below the surface. The TBM was started up and was able to successfully navigate out of the cavern in eight strokes without significant downtime to the operation.

“This is certainly unusual, to come across a cavern of this size and significance. It is somewhat related to the geology, with karstic and volcanic formations having the most potential for underground cavities,” said Detlef Jordan, Robbins Sales Manager Europe. Karst cavities were a known risk during the bore, but the cavern was not shown in vertical borehole reports conducted from the surface along the alignment.

A further 1.8 km (1.1 mi) will need to be tunneled before the 2.8 km (1.7 mi) tunnel is complete. “It is possible there could be more unknown caverns. We have a geotechnical BEAM system on the machine, and are conducting probe drilling, shotcreting, and maintenance in a separate shift,” said Dhiersat. The BEAM system, standing for Bore-tunneling Electrical Ahead Monitoring, is a ground prediction technique using focused electricity-induced polarization to detect anomalies ahead of the TBM.

The crew encountered difficult ground conditions early on in the bore, consisting of limestone with powdery clays. “When the machine is boring it does well. We have good production and it’s a good machine for hard rock. But sometimes it’s not hard rock that we encounter,” said Dhiersat. The weak rock and clay conditions necessitated ground support including resin-anchored bolts and rings in bad ground, topped with a 10 to 15 cm (4 to 6 in) thick layer of shotcrete. Despite five months of poor ground conditions, Eiffage is optimistic that conditions will improve and the tunnel will be complete in the next four to five months.

Galerie des Janots is one of the fourteen operations designed to save water and protect resources, which are being carried out by the Aix-Marseille-Provence metropolis, the water agency Rhône Mediterranean Corsica, and the State Government. The future Janots gallery will replace existing pipelines currently located in a railway tunnel—these original pipes have significant deficiencies with estimated water losses of 500,000 cubic meters (132 million gallons) per year.

The completed tunnel will pass under Le Parc National des Calanques, with cover between 15 and 180 meters (50 to 600 ft), in order to replace the pipes that are currently being utilized for the water supply networks. “The current pipes have a capacity of transit limited to 330 liters (87 gallons) per second, which is largely insufficient in the summer period. The objective of the operation is to secure the lines and increase capacity to 440 liters (116 gallons) per second,” said Dhiersat.

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**The News in Brief:**

* A rebuilt Robbins 3.5 m (11.5 ft) diameter Main Beam TBM encountered an unusually large cavern on the Galeries des Janots project in La Ciotat, France.
* The cavern included stalactites and stalagmites, and was measured at 8,000 cubic meters (283,000 cubic ft) in size.
* Contractor Eiffage erected a wall of concrete so the Robbins TBM could pass through the cavern’s corner successfully.
* Despite five months of difficult weak rock including limestone and powdery clays, the contractor is confident conditions will improve and tunnel can be completed in four to five months.

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

Captions for Images:

**Image 1:** The Robbins TBM encountered an unexpected cavern measuring 8,000 cubic meters (283,000 cubic ft) in size.

**Image 2:** Contractor Eiffage named the cavern “grotte Marie Lesimple” after their site geologist.

**Image 3:** To cross the cavern, contractor Eiffage erected a 4 m (13 ft) high wall of concrete so the Robbins TBM would have something to grip against.

**Image 4:** The 3.5 m (11.5 ft) Robbins Main Beam TBM is boring a 2.8 km (1.7 mi) long tunnel for the Galerie des Janots project in La Ciotat, France.

**Image 5:** Despite continued difficult ground, contractor Eiffage is confident in the Robbins TBM performance and optimistic that the tunnel can be completed in four to five months.