CAVE LIGHTING: A YEAR UNDER THE FRENCH SPOTLIGHT



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Grottes de Blanot. Photo: Cave Lighting CL.

Michel Renda - Expanding Cave Lighting in France

France boasts numerous show caves open to visitors, showcasing breathtaking geological formations and prehistoric art. These caves are well-organized under La Fédération Française du Tourisme et Patrimoine Souterrain (FFTS), the <u>French Federation of Tourism and Subterranean Heritage</u>, which includes nearly 80 members, primarily featuring some of the most renowned show caves in France and beyond.

Cave Lighting's journey in France

<u>Cave Lighting</u> was first introduced to French show caves in 2008 when Alexander and Luba Chrapko participated in lighting tests at Grotte de la Verna. The company's first major project in France came in 2010 with the lighting renovation of Grottes de Clamouse, where Cave Lighting managed the entire installation. After this successful project, there was a long hiatus until 2017, when Cave Lighting connected with Michel Renda during the Chameau Cave project in Morocco.



Nearly five years ago, Michel Renda was among the first people to appear in the ISCA newsletter. Download volume 2 (November-December 2020) to learn more about his life and projects: **ISCA newsletter vol. 2**

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Who is Michel Renda?

Michel Renda is a renowned French speleologist, explorer, topographer and photographer. A member of the Fédération Française de Spéléologie (FFS), Michel has discovered and explored numerous caves. His photography, capturing stunning cave formations and crystals from all around the world, has been showcased at international speleology conferences (E.G., Muotathal, Switzerland, 2012). He has also collaborated with other cave photographers to capture the beauty of underground worlds and founded an international team <u>La Salle</u>. He started his collaboration with Cave Lighting in 2018. Over the past eight years, his reputation has helped Cave Lighting gain multiple access to multiple projects in France. To date, Cave Lighting has been able to realize 13 different lighting projects in France, including 6 in 2024: Grottes de Blanot, Grottes d'Azé Rivière, Grottes d'Azé Préhistorique, Grottes de Thouzon, Grottes de St. Christophe Supérieure and Grottes de St. Christophe Inférieure.



Michel Renda. Photo: Cave Lighting CL.

Grottes de Blanot and Grottes d'Azé: Project Background

The projects at Grottes de Blanot and Grottes de Azé Rivière et Préhistorique were commissioned by the Département de Saône-et-Loire in 2022, with planning overseen by Agence Rossignol. Initial discussions were challenging, requiring Cave Lighting to make a strong case to guide the project in the right direction.

The primary objectives were:

- To enhance the caves' natural beauty while incorporating a sustainable, energy-efficient lighting concept.
- To equip these historically and archaeologically significant caves with a lighting system suitable for both scientific exploration and tourism.







Grottes de Blanot: A Natural and Historical Treasure

Located in Burgundy (Saône-et-Loire), near the village of Blanot, about 20 km southwest of Cluny, Grottes de Blanot is an impressive karst cave system known for its geological and historical significance. This cave has multi-level formations extending over 80 meters deep, including diverse formations and underground rivers that have played a key role in the cave's development. Evidence suggests the caves have been used since prehistoric times, being discovered and explored by various speleologists during the 19th and 20th centuries. After being recognized as a protected natural monument, it was open for guided tours. These last approximately 45 to 60 minutes and cover 350 meters, requiring moderate physical fitness. Availability of tours typically covers the months from spring through fall and temperature is constant (11°C), so warm clothing is recommended.

Grottes d'Azé: A Prehistoric and Geological Marvel

Grottes d'Azé is one of the region's most significant prehistoric and geological sites, offering a fascinating glimpse into both natural history and early human presence. It offers a karst cave system featuring multiple rooms and passages, including an underground river winding through the cave and stunning formations. The 560-metre Rivière tour takes approximately 1 hour and includes educational exhibits on geology, hydrogeology, and geomorphology. Another option (Préhistorique) follows a 190-meter guided path which takes nearly 40 minutes and features multiple cave entrances. Besides, the site has archaeological and paleontological significance thanks to evidence of prehistoric human settlement, including tools and fireplaces. fossils of extinct animals such as the cave bear and discoveries dating back to the Paleolithic period.



Grottes de Blanot (left) and Grottes d'Azé (right). Photo: Cave Lighting CL.





Lighting Installation

Following productive discussions, the project management team decided against using torch lights, pit lights, or colored DMX lights in the caves. Thanks to Cave Lighting, the caves now maintain a natural aesthetic, with visitors appreciating the subtle and authentic illumination and the smart switching system implemented across all three caves.

- Grottes de Blanot: Installation began in autumn 2023 and was completed in April 2024.
- Grottes d'Azé: Work followed and was also completed in April 2024.

The installation utilized Cave Lighting's proven solutions, including LSQ2, LQP2, and LMT luminaires, as well as CN2, CD2, MMC2, and CP2 control units.

- Grottes de Blanot was equipped with an analog lighting system.
- Grottes d'Azé was fitted with a PLC-controlled system with a fiber optic network.

The project was led by Adrian Titus Kondacs, who oversaw a five-person Cave Lighting team throughout the installation process.



Grottes d'Azé. Photo: Cave Lighting CL.

Special Features of the Project

This project presented unique challenges, marking the first time Cave Lighting had to navigate a highly demanding public administration process.

A major obstacle arose in January 2024, when authorities discovered around 10 bats hibernating in Grottes d'Azé Rivière. Since the installation was already in progress, bat protection measures were immediately enforced, halting work in the Azé caves and causing delays.

Following further discussions, additional guidelines were introduced to specify where and how work could proceed within the caves. While these adjustments required extra effort, Cave Lighting remained committed to wildlife protection, ensuring the project aligned with conservation priorities.







Grottes de Thouzon: A Subterranean Wonder

The Grottes de Thouzon, a stunning stalactite cave near Le Thor in southern France, was discovered by accident during quarry work in 1902. Since then, it has become a must-visit destination for those fascinated by underground wonders. Known as the "Golden Cave" due to the distinctive yellow hue of its stalactites, it offers a glimpse into a world shaped over thousands of years. Originally carved by an underground river, remnants of this ancient waterway are still visible today. The cave maintains a steady temperature of 13°C year-round, making it a comfortable and captivating place to explore. Visitors can experience its beauty through a 45-minute guided tour along a 180-meter path, where impressive lighting installations highlight the breathtaking rock formations. Expert guides share insights into the cave's rich geological history, making the visit both educational and awe-inspiring. Located in the Vaucluse region, not far from Avignon and L'Isle-sur-la-Sorgue, it is an ideal spot for a day trip, especially for families and nature lovers.

Between January and February 2024, a major transformation took place at Grottes de Thouzon, led by the Cave Lighting team—Alejandro Hernaiz, Dan Ciulpan, and Vladimir Vashkevich. Working closely with cave manager Stephan Mathieu and his team, they completed an ambitious lighting project in just six weeks. Advanced LED luminaires and a DMX-controlled system were installed, along with custom-designed control units operated via remote control. Beyond standard lighting upgrades, the cave now features a spectacular light and music show, created by scenographer Jan Ptacin. This immersive experience, which incorporates original music, custom scenography, and exclusive projections, has elevated the cave's atmosphere to new heights.

From March 2024, visitors have been able to witness the cave in a whole new way, with 3D lighting effects, enhanced depth perception, and mesmerizing visual accents. The transformation exceeded expectations, captivating visitors and even surprising the Cave Lighting team with the overwhelmingly positive response. Grottes de Thouzon now offers an even more magical underground journey, making it an unmissable experience for all who visit.



Grottes de Thouzon. Photo: Cave Lighting CL.







Grottes de Saint-Christophe: Geology and History Meet Together

The Grottes de Saint-Christophe, an awe-inspiring cave system in the Savoie region of France, lies within the rugged Massif de la Chartreuse, between Chambéry and Lyon. Shaped over thousands of years by the Guiers Vif River, these limestone caves showcase remarkable rock formations while holding deep historical and archaeological significance.

Evidence of prehistoric settlements reveals that humans have long found shelter within these caves, and over the centuries, various cultures have left their mark. The site also played a key role as part of an ancient trade and pilgrimage route once traveled by the Romans. A striking remnant of this past is the Pont Romain (Roman Bridge), a historic stone bridge that once connected the regions of Savoy and Dauphiné.

Today, visitors can explore the caves through guided tours that offer fascinating insights into their geological wonders and historical importance. Special light and sound installations enhance the experience, bringing the stunning rock formations to life. Beyond the caves, the surrounding landscape invites exploration, with scenic hiking trails that offer breathtaking views of the Chartreuse Massif.

Whether you're drawn to nature, history, or adventure, the Grottes de Saint-Christophe promises a captivating journey through time and geology.



Grottes de Saint Christophe. Photo: Cave Lighting CL.

Realization of the Project in Grottes de Saint-Christophe

This project marked the conclusion of Cave Lighting's year in France. The work took place from late August to October, led by Adrian Titus Kondacs and his team of four. The project was commissioned by the municipality, with documentation prepared by the planning office and overseen by Guillaume Vieu. The project involved two caves: Saint-Christophe Supérieure and Saint-Christophe Inférieure. While these caves feature primarily meandering passages and a few stalactites, they presented a unique challenge. Both caves are designated bat habitats and are subject to strict conservation regulations set by DREAL, the French bat conservation authority. Local planners and authorities were under pressure to meet DREAL's requirements, as failure to comply could have led to the caves being closed.





Cave Lighting's Approach

To address these restrictions, Cave Lighting adopted a two-step strategy:

- 1.Adhere to conservation conditions: All initial conservation conditions were met.
- 2. Propose alternative solutions: After discussions, alternative solutions were approved by the bat conservation authorities.

Through collaboration, the project successfully balanced the ecological protection of the caves with the implementation of the lighting system.

Implemented Solutions

- Path Lighting: Installed using warm white LED lights.
- Accent Lighting: A mix of warm white and neutral white LED luminaires provided optimal visibility while preserving the natural ambiance.
- Bat-Friendly Approach: The bats' living areas were kept completely unlit to minimize disturbance.
- Zone Lighting Control: The cave was divided into separate lighting zones, with each independently controlled to meet conservation needs.

Thanks to this seamless execution, the caves were opened before the bat protection season for Halloween 2024, allowing visitors to enjoy a new and enhanced experience.

Technical Overview

Two separate analog lighting systems with PWM control were installed. In the Supérieure cave, a DMX-controlled island solution was implemented in the large hall. The following solutions from Cave Lighting were used: LSQ2 LED Lights, LQP2 LED Lights, LMT LED Lights, EQP2 LED Lights, CN2 Control Units, CP2 Button Controller, MMC2 Multimedia Controller and RR Radio Receiver.



Lighting installed at Grottes de Saint-Christophe. Photo: Cave Lighting CL.









Water, an issue to deal with

Caves, including show caves, typically have 100% humidity, requiring fully waterproof installations. All components, from control cabinets to luminaires, must have at least an IP65/IP67 protection rating and be positioned to avoid dripping water or condensation. Active river caves, at risk of flooding, require additional precautions.

In France, three of the six show caves needed custom waterproofing solutions:

- Grottes d'Azé Rivière: Floods up to three times a year, sometimes reaching the ceiling. The UV3 cabinet and control units were installed high under the ceiling and sealed with silicone.
- Grotte de Blanot: Connected to an underground river that occasionally floods. Distribution cabinets were placed in drier zones, with carefully selected cables.
- Grottes de Saint-Christophe Supérieure: A meandering cave with an active river. A subdistribution system inside was impossible, so all controls were placed outside, with 24 VDC power running 200 meters inside. Wireless control ensures seamless operation.

Bat protection

Of the six show caves installed in France, five were subject to bat protection regulations. Only Grottes de Thouzon was not affected by these regulations and remains unaffected to this day. At the start of the project in Grottes d'Azé, no bat protection regulations were in place. Installation began in November 2023, but in January 2024, authorities were notified of the presence of several bats. As a result, the project was halted, and work came to a standstill. After some negotiations, new regulations were established, including:

- One zone in the middle of the cave had to be sealed off with polyurethane.
- However, work at the far end of the cave was still allowed to proceed.

According to Cave Lighting, incorporating break periods for bat into the timeline and budgeting for associated costs could have helped ensure a smoother integration of environmental considerations.



Water and bat protection became two of the main project issues. Photo: Cave Lighting CL

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Results

Installing six show caves in a single country within a year is no small feat. Successfully executing such projects requires effective project management, well-coordinated logistics, and a high level of responsibility from everyone involved. Crucially, the active participation of the customer plays an essential role in ensuring the success of the project.

At times, administrative processes can complicate the smooth progression of projects. However, through open discussions, Cave Lighting consistently find compromises and effectively meet their clients' expectations. Adapting to the unique challenges each project presents—depending on location and stakeholders—is also an integral part of Cave Lighting's work.

Some of the most smoothly executed projects have been in privately managed show caves, such as Grottes de Thouzon. These projects tend to benefit from streamlined processes, which allows for greater efficiency and steady progress.

Overall, all projects have been successfully completed, and the caves have already welcomed their first visitors, who are thrilled with the new lighting installations.

Finally, Cave Lighting would like to express their gratitude to all customers for their trust. Special thanks go to their internal and external teams, whose efforts made this success story possible.



Grottes de Thouzon. Photo: Cave Lighting CL.





Cave Lighting CL is an ISCA associate member. You can find more information about their incredible projects on their official site:

www.cavelighting.de



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