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THE PROJECT TO PROTECT THE TOURIST TRAIL ALONG THE CONSTANTINE RAVINE: SAFETY FOR THE NATURAL SCENIC BENEFITS OF THE TRAIL

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ABSTRACT

This study examines the evolution of the tourist trail since its update. It provides a detailed account of findings over time, highlighting various aspects of the route and the breathtaking views it offers of the Ravine Rock landscapes (Benfadel, 2016). Since the colonial era, the trail has faced obstacles that have affected its economic development. Its structuring has been shaped by historical events and their influence, particularly the Rèmes project. This analysis underscores the trail's slow expansion since the end of the French colonial period (Mekki, 2018).
Users express a desire to address the current shortcomings of the trail. Paradoxically, the caution required to navigate the route is one of the key attractions of natural tourism. The trail offers the chance to explore a natural monument, fostering meaningful interactions and providing vivid descriptions of its natural features.
The aim of protecting and developing Constantine's tourist trail is to introduce visitors to its rocky landscapes and the Rhumel, rekindling interest in nature-based tourism. The scenery - sometimes rustic, sometimes harsh due to the steep path's challenges - offers an idealistic motivation to reconnect with nature. This progression enhances the appreciation of the striking beauty of the cliffs' sheer faces.

KEYWORDS

Restoration, Tourism, Trail, Danger, Safety

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1. Introduction.

The tourist trail traverses the ravine between its two banks, offering visitors breathtaking natural landscapes and remarkable cultural sites. Spanning over 2.5 kilometers, this suspended path clings to the ravine's cliffs, crossing from one side to the other and providing a unique tourism and leisure experience (Hamadi, 2022). However, certain sections pose risks of rockfall, as noted by a civil engineer on June 5, 1915 (Canon, 1917). Addressing these risks falls under the responsibility of the promoter and owner, Rèmes.

The Constantine Municipal Council requested the construction of a retaining wall to secure the tourist trail and reinforce the slopes along National Road No. 3, situated on the Rhumel's banks opposite the train station (Gautier, 1916). This study investigates the hazards and measures necessary to restore and secure this suspended path, drawing from various documents detailing the project.

This inquiry explores the protective measures and recreational activities tied to tourism, emphasizing their significant impact on health and the development of tourism (Clout, 2003). Renowned for its route and implemented safety mechanisms, the tourist trail in this natural setting is celebrated yet remains risky for users due to environmental and human-induced changes (Lefèvre, 1991; Wanderwege, 2017).

According to Schweizer, risk prevention is crucial and must be adequately addressed. Ensuring the safe use of the trail within the natural environment of the Rhumel is essential. Evaluating natural hazards and preventing harm are fundamental to achieving safety objectives (Ribot, 1923). Walking this trail offers physical and mental health benefits while allowing a break from daily life (Wanderwege, 2017). It reconnects visitors with Constantine's

iconic rocky landscapes. This tourist route allows exploration of diverse scenery and cultural or historical landmarks, encouraging tourists to inspect monuments along the trail (PLANAT, 2015).

2. Problem Statement.

Planning the restoration, maintenance, and safety of the tourist trail involves a series of actions aimed at identifying the objectives and tasks necessary to minimize risks and ensure visitor safety. It is critical to assess the effectiveness of precautions to prevent incidents (Lebeau, 2005).

Determining which authority or organization is responsible for specific safety measures on the trail is not always straightforward. Clarifying these responsibilities is essential to ensure accountability in the event of an incident (Dubois, 1998).

Safety measures must accompany recreational activities on the trail, even though achieving total safety against all risks is not always feasible. It is important to identify the necessary safety measures and assess the environmental impacts so that users remain shielded from natural and human-induced hazards (Leclerc, 2010).

The Various Risk Prevention Measures and Responsible Organizations risk prevention measures and the roles of organizations tasked with their implementation must be clearly defined. This includes specifying the duties of each actor, their expertise, knowledge, and accountability to ensure the tourist trail adheres to safety standards and is properly maintained (Mhirsi, 2023).

These stakeholders must be capable of rationally assessing particular situations on the trail, assuming responsibilities, and acting decisively. The objective is to clarify the execution and application methods to secure the trail while making it accessible and functional for users. Preventing hazards is a cornerstone of managing the trail. However, evaluating the impacts on specific sections of the trail and high-risk zones is not always straightforward, leaving ambiguity around accountability for safety measures (Wanderwege, 2017).

Two main questions arise:

1. In which areas should necessary protective precautions be implemented?
2. How can the footbridges be safeguarded and integrated into the risk assessment process?

To address these questions, it is essential to focus on the existing risks faced by users, particularly those stemming from unforeseen natural events.

3. Tourist Trail: Genesis and Heritage Challenges During The French Period.

During a council meeting, the mayor informed the assembly that the slope along National Road No. 3, located opposite the train station and between El Kantara Bridge and Perrégaux Bridge, lacked stability and protective measures. Portions of these slopes frequently collapsed toward the tourist trail and the Rhumel (Fig. 1).

A report by the chief engineer recorded a mixed conference's proceedings concerning the proposed construction of a retaining wall between El Kantara Bridge and Perrégaux Bridge. This mixed conference, chaired by the municipal civil engineer, convened on November 27, 1916, to examine the municipality's request for a protective wall. The project aimed to shield the tourist trail along this part of the Rhumel ravine from rockfalls and other hazards (Sdh, 1916).

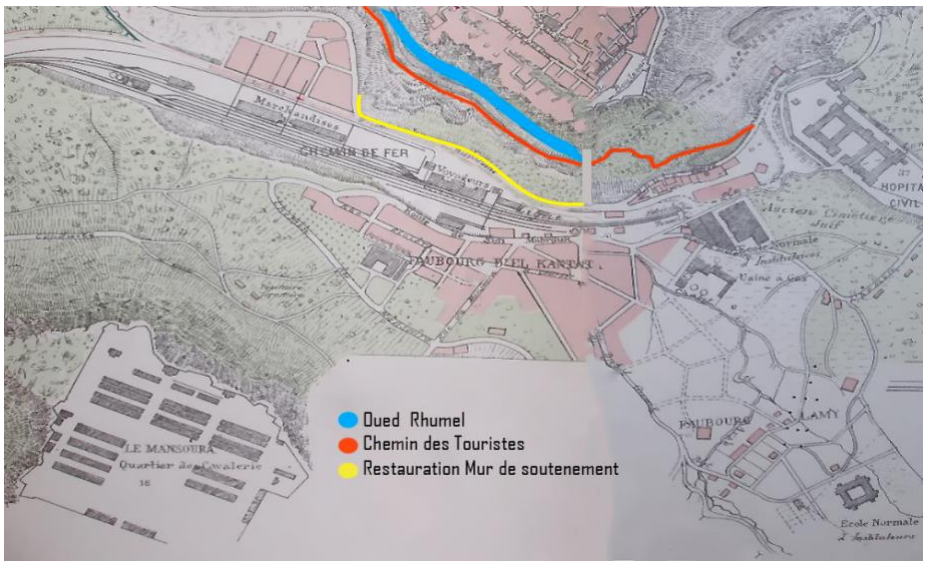

Fig. 1. Overview of the Ravine Near El Kantara Bridge, 1917.
Source: Archives de Vincennes, Paris, consulted in 2016. Processed by the author

The planned works were entirely located within the designated zone of servitudes for the area but outside the fortifications zone (Fig. 2). The civil engineer and the mayor had approved the reservations made by the chief engineer during the conference, which detailed the route, longitudinal profile, and cross-section of the structure. The engineering service also provided a plan of the Rhumel escarpments relevant to the retaining wall protection project.

During the mixed conference held in Constantine on May 26, 1917, the chief engineer proposed an unusual clause regarding the potential demolition of a retaining wall. This wall would support an embankment forming a platform.

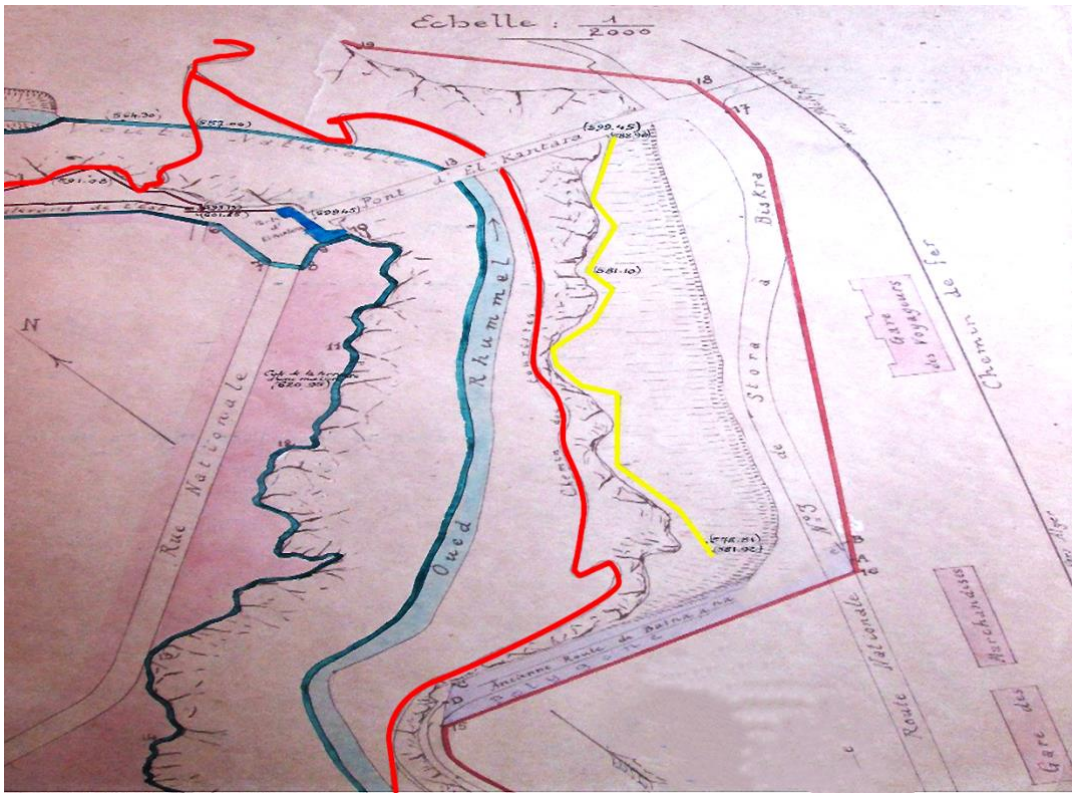

Fig 2. Plan of the Tourist Trail Construction Project, 1917.
Source : Archives de Vincennes, Paris, consulted in 2016. Processed by the author

Legend:

Projected retaining wall — Fortification rampart — Limit of the servitude zone

Boundaries of military lands — Exceptional polygon — Tourist trail

The city of Constantine accepted this condition, believing that such demolition would never be necessary. Lieutenant-Colonel Souleyre, the engineering director, shared this belief. He deemed it unlikely that indigenous attackers would use artillery against Constantine. Even in such a scenario, Souleyre argued, the attack would be so sudden and unexpected that there would be no time to demolish the protective wall before the conflict began. Thus, Souleyre concluded that it was unnecessary to impose this condition on the city of Constantine. At most, it could be stipulated that the parapet be removed upon request.

3.1 Agreement Between The Two Services.

An agreement was reached, allowing the project to progress swiftly after the chief engineer's report on May 26, 1917. According to the chief civil engineer, Raby, in his statement of June 19, 1917, the project's implementation had to comply with the conditions set by the engineering service. On July 6, 1917, Colonel Dousdebes, the senior engineering commander, determined that the project could proceed without compromising Constantine's defense, provided the following conditions were met :

a. The parapet atop the retaining wall must be no higher than 0.80 meters and no thicker than 0.40 meters.

b. If demolition of the parapet were necessary, the city would not be entitled to any compensation (Sdh, 1917).

He sought authorization to formally approve the project under these conditions, in line with the provisions of the October 1, 1907, regulations (Sdh, 1916).

3.2 Solution for Identified Hazardous Areas.

Following the conference on November 27, 1916, Battalion Chief and Engineering Head Blanleuil, along with civil engineer Mercadier, convened to evaluate the proposed construction of a retaining wall. This wall was intended to protect the trail and reinforce the slope.

The mayor of Constantine, Maurinaud, participated in the meeting and raised concerns about the stability of the ravine along National Road No. 3, opposite the train station, between El Kantara Bridge and the tourist trail. He emphasized that sections of the cliff frequently collapsed, posing severe risks to visitors (Fig. 3).

Maurinaud proposed constructing a retaining wall to keep tourists safe from danger. The project presented at the conference met the municipality's expectations. It proposed the construction of a retaining wall of variable height along the escarpment.

This wall would create a platform at least 4 meters wide, designed to halt rockfalls and accidental stone detachment on the right bank between Bab El Kantara Bridge and Perrégaux Bridge (Fig. 4) and extending to the left bank (Fig. 5).

This wall, running along the edge of the ravine, "offers numerous viewpoints over the ravine and provides an enjoyable promenade for both residents and visitors of the city. This heritage project serves an aesthetic, political, or social purpose" (Andreu-Boussut; Chadenas, 2017).

Fig. 3. Rockfall Risk on the Tourist Trail, 1917.
Source: Archives of the Château de Vincennes Library, Paris, 2018

Fig. 4. Tourist Trail Across the Two Banks, 1917.
Source: Archives of the Château de Vincennes Library, 2018

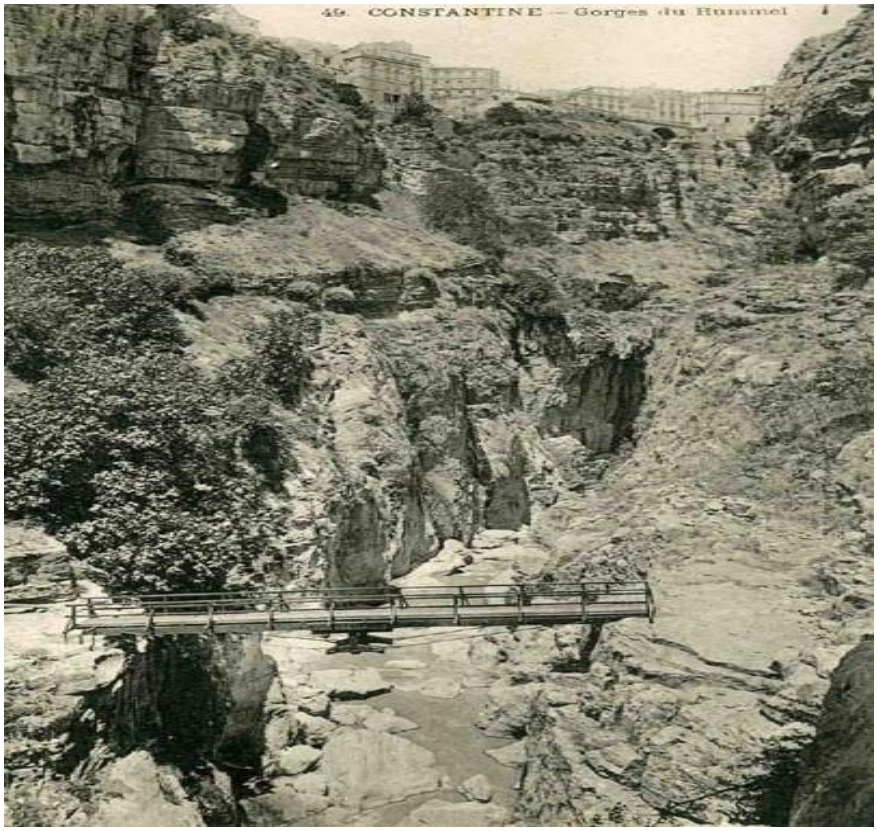

Fig. No. 5. Passage of the path of the two right and left banks, 1917.
Source: Archives of the Château de Vincennes Library, 2018

These three dimensions are essential for understanding the profound meaning of heritage, as emphasized by G. Di Méo (2008). Historians' work demonstrates that nation-states have developed complex strategies to construct their national identity, selecting historical elements to legitimize their existence (Thiesse, 2001; Hartog and Revel, 2001).

3.3 Current Descriptive State of The Path.

According to the civil engineer, the path begins in the south, near the Sidi Rached gate, consisting of steps and slopes. It reveals the right quay of the rock about one hundred meters upstream from the Devil's Bridge. On the left quay, perched on a rocky outcrop, stands the Sidi Rached Mosque. The path passes beneath the Sidi Rached Bridge, then follows the right bank of the Rhumel River, threading through the rock's chasms at an elevation of 30 to 50 meters above the Rhumel River bed (Fig. no. 6).

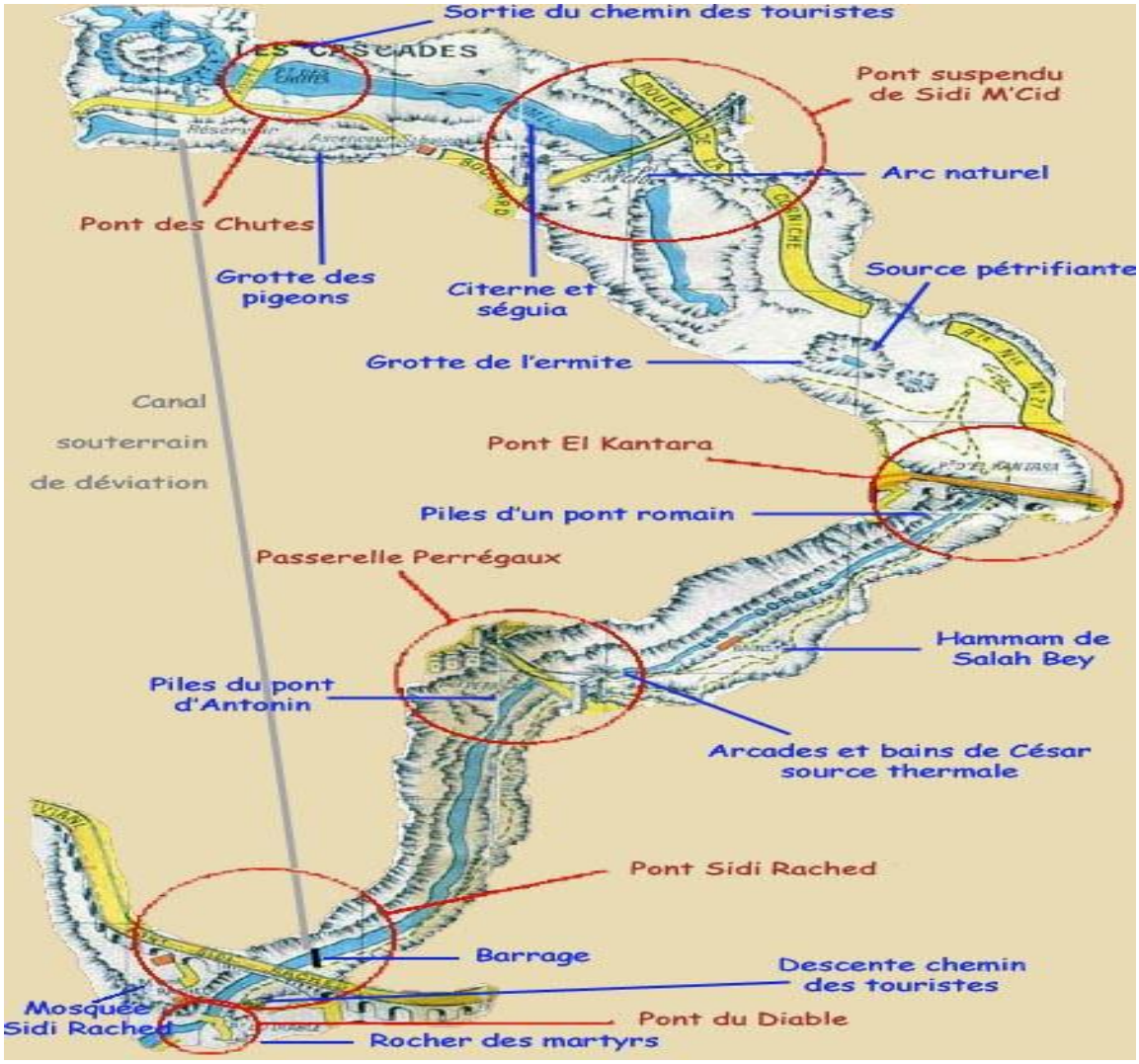

Fig. 6. Map of the Gorges and Tourist Path Routes, 1865.
Source: Alphonse Marion, The Epic of the Rhumel Gorges in Constantine, 2016

Before the El Kantara Bridge, near the railway station, lie the remnants of an ancient Roman bridge scattered along both banks. At the height of the El Kantara Bridge, another entrance provides access to the crossing. Beyond this bridge, the path passes beneath a natural arch formed by the Rhumel, approximately 300 meters long, with two metal walkways facilitating access between the left and right quays, although the right quay is significantly lower.

Beneath the arch, one encounters deposits formed by the gradual infiltration of liquid containing calcareous and siliceous salts. These deposits accumulate on the surface of the arch and within the floor of subterranean cavities where the same mineral-laden waters drip down, creating fascinating mineral formations.

The Path's General Accessibility overall, the path does not present major difficulties for users. Steep sections are equipped with stairs, and areas at risk of falls are safeguarded with railings. Watercourses are crossed via footbridges or bridges. Some parts of the route, however, can be challenging to access due to abrupt inclines and narrow spaces (Mhiris, 2023).

Organizing a project of this nature requires clear definitions of objectives and necessary tasks, particularly in terms of development, maintenance, and ensuring the safety of the route responsibilities that fall under the State's jurisdiction. Safety remains a priority in planning for local authorities (Higigabal, 2019).

3.3.1 Focus on Securing The Path.

Ensuring the safety of the tourist path is a key concern for all authors and organizations involved. Measures must be implemented to adequately protect tourists and eliminate potential dangers. It is also expected that tourists will use the path responsibly and cautiously (Mhirsi, 2023), adhering to the guidelines issued by the Municipality of Constantine to avoid reckless behavior.

3.3.2 Level of Public Usage.

The maintenance of Constantine's tourist path relies heavily on its usage and level of visitation. A comprehensive evaluation of risk management is essential (Wanderwege, 2017), which includes assessing safety in hazardous areas and implementing protective measures. In practice, every individual embarking on this tourist path must be fully aware of potential unforeseen dangers, their personal responsibility, and the importance of complying with the path's conditions to prevent incidents (Croutsche, Roux, 2005).

The path must be secured as soon as any potential accident risk arises, even if tourists exercise ordinary caution and prudence. This includes, notably, the construction of retaining walls to mitigate risks and prevent accidents.

Individual responsibility among tourists is critical. The primary aim of securing the path is to protect users against less apparent dangers, such as those arising from natural disasters (Proulx, 2005).

3.3.3 Unpredictable Hazards.

The tourist path through Constantine's ravine offers a cultural and leisure experience in the heart of nature. Users must remain aware of unpredictable weather conditions, such as sudden temperature changes, precipitation, ice, and gusty winds (Vles, 2016). In such situations, users must adapt to the associated risks.

This principle also applies to unexpected natural events, such as falling rocks, which can occur in both high-risk and seemingly safe areas, particularly in sections suspended along the cliffs. Natural hazards like rockfalls are "inherent risks of crossing the two natural ravines." Users must acknowledge these dangers when taking the path (Rando, 2017).

4. Tourist Path: Urban Planning Challenges.

The rehabilitation project for Constantine's tourist path, connecting the "Devil's Bridge" to the "Waterfall Bridge," encompasses several key aspects. These include restoring and developing the path, repairing the Roman baths of Caesar that overlook the Rhumel ravine, and refurbishing the cable car facilitating vertical transportation for tourists from the Sidi M'cid valley (Hamadi, 2022).

This project is critical not only from a tourism and economic perspective turning it into a major attraction for visitors to the Rhumel gorges and locals alike but also for creating job opportunities for unemployed city residents and generating significant revenue for the municipality (Hamadi, 2022). User safety remains a central concern, requiring thorough studies to ensure adequate protection against potential risks.

Ongoing restoration remains a top priority, ensuring that Constantine's tourist path stays accessible and well-maintained. In France, the protection of natural sites, even those classified as picturesque under the 1906 law, is governed by the 1930 law (Soualah, 2022).

The rehabilitation of Constantine's tourist path includes restoring an access staircase near the El Kantara Bridge, connecting it to a platform leading to the trail. Ensuring the safety of all sections of the path is paramount, requiring careful restoration in compliance with standards to promote sustainable tourism. Sustainable tourism emphasizes respecting the environment, fostering the economic development of visited

sites, and considering the rights, working conditions, and local cultures of those involved (Notre Environnement, 2021).

5. Observation and Preliminary Solutions.

The Constantine tourist path must ensure all infrastructure - such as railings, walkways, staircases, etc. - functions correctly to guarantee user safety. Any malfunction could pose an immediate danger to tourists. Restorations should address various elements, such as retaining walls, balustrades, and ensuring the path itself is secure, even in steep or abrupt areas (Hamadi, 2022).

Predicting all potential natural degradations, such as land subsidence or erosion, remains challenging without prior studies. Therefore, restorations must be well-planned and carefully assessed to mitigate potential risks throughout its use, employing sustainable methods to maintain safety and infrastructure quality over the long term (Wanderwege, 2017). Proper management of wastewater drainage systems affecting sections above the riverbanks is also essential.

5.1 Technical Assessment of Hazardous Areas Restoration.

The tourist path through the Rhumel gorges in Constantine must be established and maintained according to rigorous safety standards (Giraud, 1995). Any errors in design or maintenance could present significant risks to users. Closed after the 1958 floods and further degraded by harsh weather, this path—beautifully integrated into the cliff faces along both banks—represents an exceptional tourist attraction for Constantine. Its rehabilitation could significantly boost local tourism (Benamar, 2008).

Sections of the path constructed from wood, susceptible to high humidity, may face challenges concerning the solidity and stability of structures like walkways and railings. To prevent such damage, regular inspections and maintenance are essential (Dupuis, 2012). Frequent monitoring is recommended to address aging, weather conditions, and natural factors (Paige-Green, 2019).

Effectively protecting this path against risks hinges on an in-depth assessment of specific hazards in each section, especially those near vertical cliffs or steep slopes. Every detail, from risk forecasting to the overall state of the path, must be meticulously studied and integrated into the comprehensive management of the restoration project (Hamadi, 2022). Ensuring transparency and demonstrating progress, achievements, and results tied to specific objectives—such as periodic evaluations of restoration benefits and beneficiaries—should follow the principle of results-based accountability (Ray, 2020).

5.2 Unintentional Risks.

Ensuring the safety of tourists on Constantine's tourist path requires preparation against unpredictable natural hazards, such as rockslides, landslides, and soil erosion that typically occur during heavy rains or storms. These events can cause stones and debris to fall onto sections of the path, often without warning (Rando, 2015).

5.3 Susceptibility to Tourist Path Hazards.

Identifying high-risk sections of the path is challenging since those involved in its management are not always experts in natural phenomena. However, adopting a proactive approach to recognize and address potential risks is essential, considering seasonal variations and weather conditions (Marie-Noëlle, 2023). Continuous vigilance is necessary to anticipate any major natural event that could pose a threat or imminent danger to tourists.

5.4 Crossing the Two Banks of The Rhumel.

The pedestrian bridge connecting the right and left ravines of the Rhumel requires special attention. "To prevent the risk of falling into the water in case of a slip, railings should be installed on both sides of the bridge. Risk assessments should also account for the Rhumel's average flow, ensuring a safe crossing for visitors" (INNOTECH, 2023).

5.5 Regulation of The Tourist Path.

For the safety of tourists, the design and categorization of the tourist path within its natural environment must be carefully planned. Each segment of the path should integrate harmoniously with the surrounding landscape while adhering to general restrictions and principles. Tourists' experience is shaped not only by safety measures but also by the natural beauty of the environment and the immediate surroundings (Rando, 2017).

Risk assessments should pinpoint potentially hazardous sections of the path and propose suitable preventive measures, such as repairing at-risk areas or constructing protective structures (Brehan, Doud, 2016).

Conclusions.

To ensure the safety of Constantine's tourist path, it is crucial to evaluate and mitigate potential risks. This evaluation helps identify necessary preventive measures to maintain the path's usability and safety (APS, 2022). Retaining walls along slopes are vital for protecting the public from the natural hazards inherent to this geographic area (Hamdani, 2009).

Risk management requires a thorough analysis of high-risk zones and their likelihood of occurrence. This includes routine cleaning and maintenance of existing structures, such as retaining walls built during the French colonial period, as well as the cliffs of the left and right ravines (Bessaoud, 2010). This approach aims to preserve the path's quality and safety, ensuring an enjoyable and secure experience for visitors and residents of Constantine (Bravery, 2006).

This method not only secures the path but also integrates it seamlessly into its natural setting, meeting visitor expectations while minimizing safety risks (Collard, 2023).

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