

# Revitalised geotourism mining heritage potentials in the Posavje Folds

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## Abstract

The territory of the Posavje Folds offers many geotourism potentials reflecting in particular in rich mining heritage. For a long time, local communities have considered them mainly in the context of local problems, but nowadays we may see individual examples of successful revitalization of cave chambers and mining structures. All that has given rise to fantastic stories about the mining wealth of the underground world and the mining heritage interpreted with modern approaches and new findings. In addition to managers and heritage owners, the revitalization process also includes scientists, artists, architects and educators who, each in their own way, contribute to a holistic perspective of the values of the past in light of contemporary understanding of this type of heritage. As a result, the territory has witnessed the revitalization of the medieval lead and silver mine Padež pri Laškem, the former Laško coal mine machine room, which was transformed into the Strojnica Gallery, and the polymineral mine Sitarjevec within the last five years. All mentioned examples are cases of abandoned mining activities with long-lasting mining tradition, which left an imprint in the area in terms of the diverse social structure of the population and in terms of town development, which also allows us to evaluate from a distance the contribution to the construction of the railway between Vienna and Trieste, which put these towns on the European map of centres of industrial significance in the mid-19th century. Trains that still connect the Austrian capital with the Adriatic coast may in future, in light of sustainable green tourism, attract curious guests to stop and linger a while, which is the ultimate goal of the attempts of local communities to revitalise mining heritage. Meanwhile, the goals set can only be realised with the help of new and attractive tourist products that reflect own creativity related with tradition ranging from design ideas, music events, art installations, popular science evenings; in short, with contents that are suited to visitors of all ages.

**Keywords:** mines, heritage, revitalization, geotourism

## INTRODUCTION

Approaches to the awareness of the importance of mining heritage revitalisation are interdisciplinary and multi-layered. They include local communities, societies, non-governmental organisations, educational and research institutions, artists and cultural establishments. Mining heritage brings together the protection of natural and cultural heritage and interpretations deriving from intangible heritage related with mining life. Mineral resources have been the driving force of civilisation development changing the world both in

terms of settlement as well as in terms of cultural landscaping. Upon present awareness of the importance to preserve mining heritage, a strong tendency emerged to revitalise abandoned mines and mining architecture for tourism purposes, which has posed new challenges mostly in view of a sustainable economy. In the last decade, such trends have also been closely pursued by Slovenia, which has been included in the Global Geoparks Network with Geopark Karavanke and Geopark Idrija, but has not yet fully used all of its potentials to revive and promote mining heritage, particularly in the Posavje Folds, which also belong to the

list of potential geoparks according to some research studies (Erhatic, 2013). For that reason, it is necessary to devote all attention to programmes that have contributed to the revitalisation of individual mining heritage structures of the place for the past few years using the development funds provided by local communities and national (Perkmandelj) and international projects (VirtualMine). Considering the visits, there is a large interest in the inclusion of such tourist products in rural adventure tourism. That is vital for the improvement of the situation in industrial heritage and farm/rural tourism in Europe, where Slovenia is found at the bottom according to the analyses made within the scope of the European structural and cohesion policy (Internet 1).

## RESULTS AND DISCUSSION

### *Revitalised mining heritage structures in the Posavje Folds*

Geographically, the Posavje Folds are a hilly terrain spanning between the Ljubljana Basin in the west and Obsotelje in east

Slovenia. The shape of the surface results from the rock structure and past tectonic movements when rock would fold, which is why it represents an area of anticlines and synclines capturing mineral resources ranging from lead, zinc, mercury, barite and silver to lignite. Mineralised rock with metal minerals dates back to the Permo-Carboniferous Period, while coal seams are found in the rock of the Oligocene epoch.

Two of many metal mineral deposits in the area have been revived, i.e. the Padež mine and Sitarjevec mine, while mining heritage related with the present coal extraction is available in Govce (Laško coal mine) (Fig. 1). The ore-bearing rock at the Padež and Sitarjevec mines is micaceous-quartz sandstone with inclusions of dark grey feldspar and siltstone, while mineralisation took place as a result of tectonic movements that caused the cracking of quartz sandstone and the penetration of hydro-thermal solutions enriched with ore minerals and flint in the cracks (Herlec et al., 2006). Coal seams in Laško are found in molasse deposits of the former Pannonian Sea (Mlakar, 1986).



**Fig. 1** Location of the revived mining heritage structures in the Posavje Folds in Slovenia

By reviving the mining structures of the place, access to rich mining heritage was provided to the general public, whereby the Republic of Slovenia follows the goals of the European Heritage Strategy for the 21st Century, as adopted by the Committee of Ministers of the Council of Europe at its 1278th session (Internet 2). Among other things, territorial and economic development (component D) highlights relations between cultural heritage and territorial development, the economy and local and regional management by taking into account the principles of sustainable tourism. In particular, strong focus is on the involvement of local communities, which is also expressed to the greatest extent possible in projects to revitalise mining heritage in the Posavje Folds.

#### ***Revitalisation of the medieval lead and silver mine Padež***

The process to revitalise the Padež mine started with the purchase of a small farm by the Slapšak family, which later turned out to have a narrow entrance to a mine tunnel in the forest. The desire to explore led the land owner to the first attempts to enter the underground world and, later on, to extensive cleaning of the collapsed mine tunnels, initially to search for a water resource in order to supply the farm with drinking water and later to an idea of offering the mine to the public within the scope of tourism development at the farm. During cleaning, mine galleries revealed interesting cave formations, cave pearls, sinks and aragonite urchins, which the farm owners wished to present to the general public. The project to revitalise the Padež mine was later also joined by Laško Municipality, which contributed to the arrangement of mining infrastructure, geological research and popularisation within the scope of the Perkmandeljc project, funded from the Rural Development Programme. Experts who participated in the research of the past development of the mine found that it was a medieval lead and silver mine that could not be detected in old maps of mineral

resources due to its strategically important mineral resources (Maček, 2002). The Slapšak family, therefore, unveiled a mine that was long forgotten, with its intact mine galleries featuring magnificent cave formations of various colours and forms shaped by unstoppable forces of nature. The revitalised mine is managed by the Slapšak family and marketed for tourism purposes, and the abandoned mineshaft also holds adequate quantities of drinking water to supply the homestead (Fig. 2). Entry to the underground world is organised by agreement in small groups led by a member of the Slapšak family, so that visitors can experience a contact with heritage to the maximum possible extent, since the person who has discovered it, put it into order and maintained it is its best interpreter.

#### ***Strojnica Gallery in Govce***

The land today known as Govce has evolved for millions of years in slow, yet persistent processes, like the tunnels produced by miners featuring impressive underground architecture that lies beneath Govce. By reviving mining heritage in Govce, particularly in the former machine room next to Liša shaft, a new chapter has opened in the development of a dialogue between the local community, experts, researchers and artists.

With due respect for the conservation of the rare ruins of former gems of farming architecture and heritage memories of past mining, new possibilities have opened to make a place of historic remembrance such as Govce also a development opportunity for the local community. The matter was the subject of a paper entitled "Govce" that was drawn up at the Faculty of Civil Engineering, Transportation Engineering and Architecture at the University of Maribor within the scope of participation in the VirtualMine project. The spatial planning study contains proposals to revitalise all potentials that are available on site (Fig. 3). It includes natural and cultural heritage, whereby the revitalised former mining machine room, transformed into the Strojnica Gallery (Machine Room Gallery),



**Fig. 2** A – Slapšak homestead, B – Aragonite urchins, C – Cave pearls, D - Drinking water catchment in the shaft



**Fig. 3** Revival of heritage potential in Govce: A – The ruins of Govce village, B – Laško coal mine, C – Strojnica Gallery featuring the Odstiranja and Sence exhibitions, D – Music event in front of the Strojnica Gallery

already hosts a rich cultural and artistic programme (Kobale et al., 2018). Hence, in cooperation with the Faculty of Natural Sciences and Engineering at the University of Ljubljana, Department of Textiles, pH15 group and the Slovenian National Building and Civil Engineering Institute, the room first hosted an exhibition entitled "ODSTIRANJA"(Unveilings), which was later accompanied by an exhibition of sculptures made by Milojka Drobne entitled "SENCE" (Shadows). Upon other occasions, the idyllic room held a music and dance event, a concert, a children's event, a full moon gathering and so on.

No doubt, Govce is an exceptional tourist potential that hides several 10-kilometre-long mine galleries featuring an interesting walk into the past intertwined with geologic natural assets and mining heritage related with lignite extraction from the 19<sup>th</sup> century to its closure in 1992 as well as with the memory of post-war events at Huda jama. All those potentials are the focus of development issues at the planned Ecomuseum of Mining, which is being developed by Laško Municipality together with partners (Fig. 5).

### ***Revitalisation of the Sitarjevec mine***

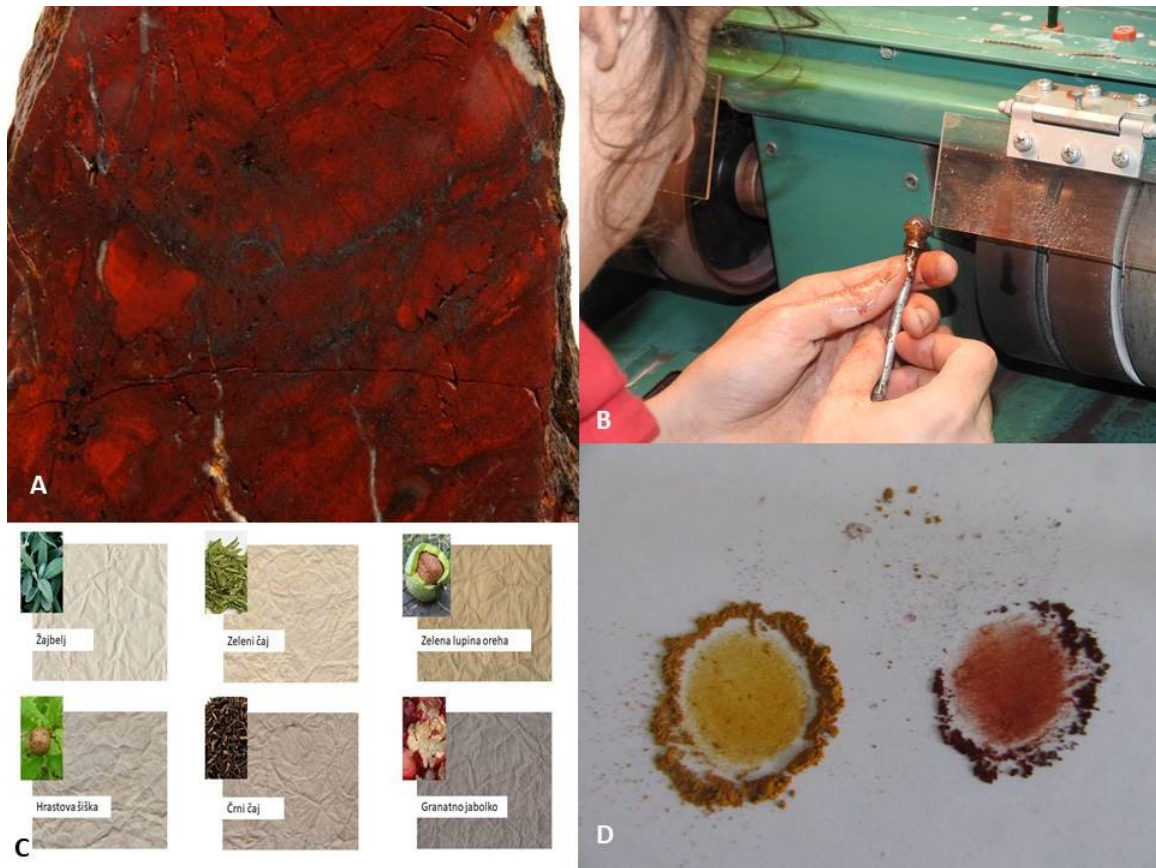
The Sitarjevec polymineral mine has been declared a natural asset of national importance due to its extraordinary mineral wealth. The mining tradition at the Sitarjevec mine dates back to the Celtic era, when the mine was allegedly used to extract the raw material for the production of the famous bronze Vače situla. The mine was used by the Romans and was first mentioned in the Middle Ages. The mine was abandoned and reopened several times, but was finally closed in 1966 due to a lack of investments in research and the ingress of water.

The Sitarjevec mine was a strategic mineral deposit of lead, zinc, copper, mercury, barite and iron ore (Preisinger, 2010). In 1886, the Litija smelter succeeded for the first time in obtaining silver from the ore extracted at Sitarjevec, which was used in the same year to manufacture the

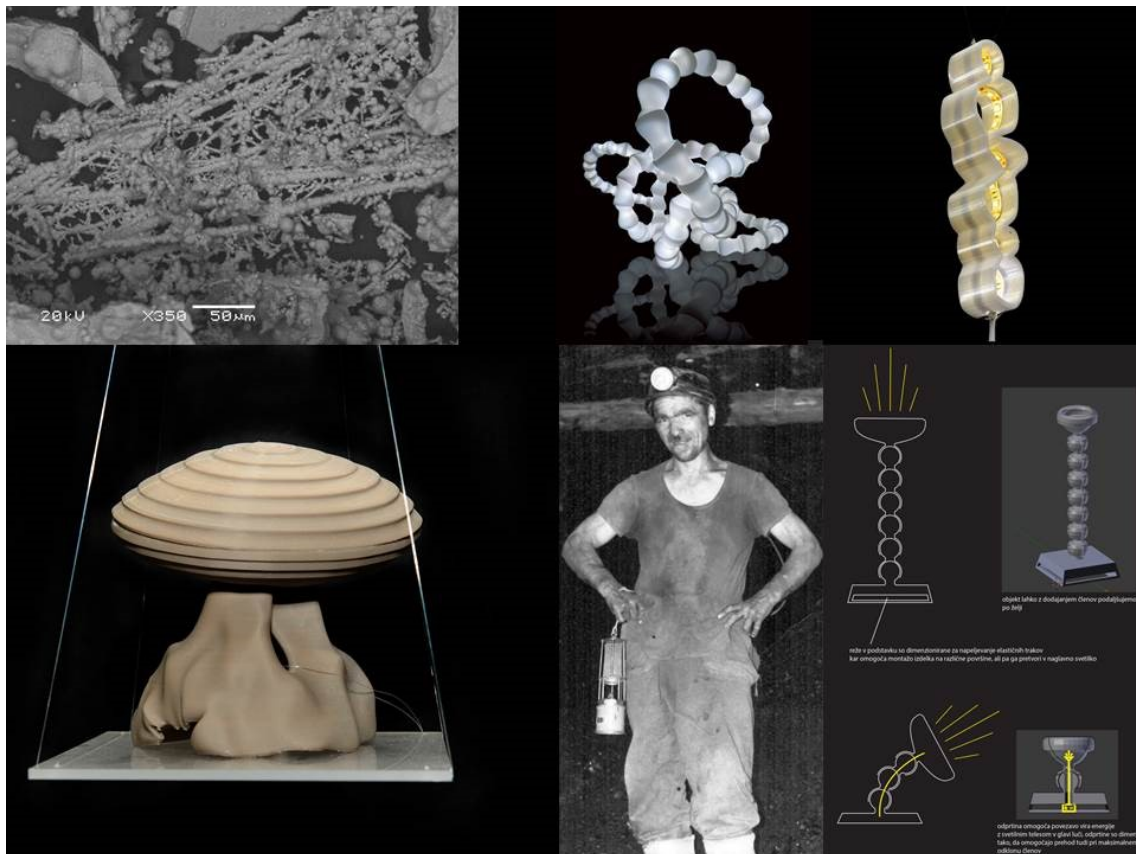
renowned Litija commemorative coins at the national mint in Vienna.

Today, the Sitarjevec mine is getting a new image, as it is being rearranged for tourism purposes by Litija Municipality. The first 100 metres of tunnels have already been revitalised and transformed into a museum product, while other mine voids harbouring mostly magnificent limonite cave formations are yet to be arranged. In cooperation with research and educational institutions, parallel research of the mine is being conducted that will contribute to a better interpretation of natural assets and mining heritage. A part of research is also included in the international VirtualMine project, which has yielded new tourist products attractive to the expert and general public in cooperation with the Slovenian National Building and Civil Engineering Institute, Department of Textiles at the University of Ljubljana Faculty of Natural Science and Engineering, Slovenian Museum of Natural History, Vocational College at the Srečko Kosovel School Centre in Sežana and Litija Municipality. The research has shown that the Sitarjevec mine is the site of the semi-precious stone hematite with jasper, which can be used for the manufacture of jewellery. Another interesting feature is the mine water, which is rich in iron and represents a potential natural dye for dyeing textiles. The experimental work conducted at the Department of Textiles at the Faculty of Natural Sciences and Engineering proved that the mine water mixed with an organic tincture made of pomegranate peelings may be a good dye for cotton fabric. The Sitarjevec mine is also extremely rich in the natural ochre pigment, which is deposited in abandoned mine tunnels. The latest research has shown that the pigment can be used particularly for artistic purposes in two versions, ochre and shades of red obtained from the thermal treatment of the ochre pigment (Fig. 4).

A group of students at the Department of Textiles of the Faculty of Natural Sciences and Engineering thought up of a way to enlighten the mine void and developed



**Fig. 4** Mineral potentials of the Sitarjevec mine: A – Hematite with jasper, B – Jewellery cutting, C – Textile dyeing with mine water and organic tinctures, D – Pigment



**Fig. 5** Challenges in the design of modern lights within the context of mining heritage and minerals

a series of lights from mining heritage motifs that were printed 3D at the Slovenian National Building and Civil Engineering Institute. An ad-hoc exhibition of the lights has fascinated visitors and prompted them to consider mining heritage with contemporary thought (Figure 4).

## CONCLUSION

Many past studies have revealed rich natural and cultural heritage in the Posavje Folds, which has contributed to tourism with individual cases of mining heritage revival. By integrating local settings, research and cultural organisations, and the economy, foundations have been laid to intensify efforts to exploit potentials and introduce new projects in regional development. The place that used to dictate the development of society due to its mineral resources dropped way behind the rest of Slovenia after the downfall of the mining industry. Regeneration processes focusing primarily on new economic programmes strengthened in the last few years, reducing unemployment, resolving environmental problems and, fortunately, reviving mining tradition for tourism purposes. Good practice examples to revitalise mining heritage have demonstrated that new tourist products attractive to modern tourists and providing

a basis for further development may evolve only through an interdisciplinary process. The integration of tradition and modern interpretation approaches including the latest findings and advanced technology represents a possibility to open sustainable tourism to the world beyond the boundaries of the local environment.

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