EUROLITHOS European Ornamental Stone Resources

Eurolithos case study

Best practices of natural stone valorisation for the preservation of stone-built heritage: the case of platy limestone as characteristic element of cultural landscape along the Eastern Adriatic coast

Thematic focuses: Ornamental stone resource value assessment, Stone and built heritage

Responsible partners: Geological Survey of Slovenia (GeoZS), Croatian Geological Survey (HGI-CGS)

Authors: Matevž Novak (GeoZS), Snježana Miletić (GeoZS)

Foreword

From antiquity to the present day, limestone has been used as a traditional building material and it gives a common identity to the cultural landscape of all countries along the karstic Eastern Adriatic coast. In addition, the cultural landscape contributes to the formation of local cultures while giving prosperity and increasing Europe's visibility.

One of the oldest building materials in the region of Eastern Adriatic coast is platy limestone. Thick layers of the stone near the surface were the reason that numerous small excavation sites still existed in this area in the mid-20 century. The extensive use of platy limestone as building material is recorded in central and south-western Herzegovina, central Dalmatian islands, on Pelješac peninsula, broader area of Trogir and Benkovac, as well as in western Istria and in the Classical Karst region.

Valorisation of limestone as a mineral raw material does not only depend on the purpose of its exploitation and final use. A limestone quarry may simply present an industrial facility, but if it is paleontologically significant it may be valued as a natural heritage site, and if it is known for a very long history of stone excavation, such quarry turns to a cultural heritage site. So, in the case of limestone the borderline between the natural and cultural heritage is extremely narrow, which may cause the wall between best intentions for the protection of each of them hard to break.

The objects with roofs made of platy limestones in the region are mostly abandoned and in a bad state of preservation. Obviously, clear-cut guidelines in spatial planning, town planning, construction and the preservation of cultural and natural heritage are needed for the sustainable use of platy limestone as a building material.

Executive summary

Preservation of the stone-built heritage and cultural landscape along the Eastern Adriatic coast and its karstic hinterland face challenges when trying to access traditionally used autochthonous building material, i.e., platy limestone. The main obstacles are in the rigid legislation where stakeholders in spatial planning, urbanization and cultural and natural conservation lack firm guidelines for sustainable use of natural stone as building material, then for conservation of the stone as natural heritage and finally for conservation of stone-built cultural heritage. As consequences, building stone is often used incorrectly or inappropriately, it is often replaced with non-autochthonous stone or other materials, and characteristic architectural elements of many buildings are often damaged, destroyed or falling into decay.

An interdisciplinary study in countries of the Eastern Adriatic region addressed aforementioned problems from all aspects, i.e., from geological characterization of platy limestone, its occurrence and exploitation potential to its use in architecture, natural and cultural heritage preservation, and legislative framework, including stakeholders involvement through practical workshops.

The loss of stone-built cultural heritage is a major problem in Europe and worldwide, so this case study, which has been thoroughly analysed in the RoofOfRock project, provides a system of best practice protocols for identifying, valorising, promoting and sustainably using natural stone as a building material. They should be used for preparation of recommendations for legislative changes that will help to protect and preserve both natural and cultural heritage.

Keywords

Platy limestone, Natural stone valorisation, Cultural landscape, Guidelines, Legislation, RoofOfRock

Table of contents

Description of case study 3
Methods applied 6
Geological characterization 6
Provenance analysis of limestone used in selected objects 7
Drafting the guidelines for legislative amendments 11
Case study results 12
Sustainable extraction of limestone plates 14
Case study conclusions 16
References 18

Description of case study

Along the Adriatic karstic coast and its hinterland platy limestone was and still is one of the most recognizable elements of the cultural landscape. Because of its platy shape, it has been usually used the same way as schist or slate in other regions, mostly for paving, roof tiling or building of shepherd cottages and dry walls (Figure 1). In some regions, platy limestone has been exploited since the later Prehistory, although the most of its use is known from the Roman times. They dug it in backyards or in small delves in the vicinity of their settlements (Čebron Lipovec et al. 2015, Novak 2015, Novak et al. 2015a). Due to safety standards and other regulations related to mining and extraction as well as natural preservation and conservation such exploitations are not possible today. If one intends to renovate or build a house in the traditional manner, numerous challenges appear, as is the lack of knowledge on how to proceed, adequate information and legal basis are not available, neither is legally accessible building material. These are reasons why building stone is often used inappropriately or replaced with non-autochthonous stone and other materials. Characteristic stone architectural elements of such objects are often damaged, destroyed or falling into decay (Figure 2). Such loss of stone-built cultural heritage is a significant problem not only in Europe (Cosi and Primavori 2016, Everett 2017, Heldal 2017, Hyslop 2017).

Figure 1. Typical architectural elements of cultural landscape of the Eastern Adriatic coast. Reproduced from Novak (2015).

This case study provides an example of how to face these issues from all relevant aspects. It is based on the results of the RoofOfRock Project - *Limestone as the common denominator of natural and cultural heritage along the karstified part of the Adriatic coast* (Novak 2015, Novak et al. 2015a, RoofOfRock Web Portal).

In the case study it was the found out that stakeholders (spatial planners, cultural and natural conservators, local government), craftsmen, architects and general public lack firm guidelines for sustainable use of natural stone as building material, for conservation of the stone as natural heritage and for conservation of stone-built cultural heritage. Beside that the primary problem is the acquisition of autochthonous building material. According to Peternelj (2015), limitations for the extraction of the platy limestone are set due to two possible scenarios. First is that exploitation of platy limestone may have negative impacts on nature (e.g. deforestation, changes in hydrological or hydrogeological conditions and quality, defacement of the natural landscape, habitat transformations that promote invasive species colonization, the depletion of the natural resource, noise and vibration, etc.). And second, valuable and rare fossils, minerals or speleological objects, important as natural heritage, could be found during the exploitation.

The goal was to establish joint platform for platy limestone sustainable use, preservation and promotion, to create the relevant guidelines and to upgrade capacities in preserving such common natural and cultural heritage along the karstic coast of the Adriatic Sea.

In order to assure adequate management of limestone a system of best practice protocols in identification, exploration, exploitation and use of building stone was set up.

Key aspects of the case study were:

• To analyse the use of building stone along the Eastern Adriatic coast through time and to identify examples of best and bad practice.
• To define general natural characteristics of limestone used as building material and to precisely characterize the natural characteristics and extent of natural appearance for the specific platy limestone.
• To identify provenance of stone used in architecture and to analyse the spatial distribution of the specific rock types in nature.
• To identify remaining natural resources and analyse conditions for sustainable use of this mineral commodity and to prepare grounds for common legislation in the project area.
• The main focus in the study was solving the conflict between the use of platy limestone for maintenance of cultural heritage and its preservation as natural heritage.
• Finally, representatives of ministries, regional and local governments and institutions in the field of protection of natural and cultural heritage and others involved in the decision-making process are addressed in the document drafted to convey the recommendations for legislative changes and are reminded on the urgency of the amendment of such legislation if the stone-built cultural heritage is to be preserved, renovated and maintained. Key stakeholders in the region were involved in practical thematic workshops.

Figure 2. Bad practices in cultural heritage preservation and restoration. a Deterioration of stone-build house in Nakovana, Pelješac peninsula, Croatia. b Mimicking the vernacular architecture, Kras/Carso, Italy. c Mixing the roofing material, Kras/Carso, Italy. d Replacement of autochthonous limestone plates with industrial tiled covering, Saint Ulderico church in Sgonico, Italy. Reproduced from Novak (2015).

Methods applied

The occurrence and use of platy limestone on the coast of Eastern Adriatic has been thoroughly analysed, taking into account the following aspects: geological characterization, conservation of natural and cultural heritage, its protection, architecture and related legislation. A further analysis was carried out in relation to the existing natural platy limestone resources. It included restrictions on the use of platy limestone according to its suitability for further exploitation in the spirit of best practice. In addition, an extensive database was set up as a desktop GIS map viewer, a web application and a mobile application. To present best practices and responsible use of platy limestone to key stakeholders in the case study region, fifteen practical workshops were organized as well (Novak et al. 2015a, b).

Geological characterization

Geological characterization of platy limestone which occurs along the Eastern Adriatic coast, is based on the overview of all most important types of limestone used in architecture. Furthermore, the most important limestone quarries were than listed and a harmonized cross-border geological map of building limestone at a scale of 1:250,000 (Figure 3) with estimated exploitation potential was made. The detailed geological mapping between Trieste and Dubrovnik resulted in the map of occurrence of platy limestones at a scale of 1:50,000. Platy limestone types are than determined and classified according to their sedimentary, stratigraphic and paleontological characteristics while estimations of limestone quality (geomechanical and physicochemical properties) and quantity were prepared (Jež et al. 2015). This was the base for the assessment of potential exploitation activities and methods to safeguard the natural environment.

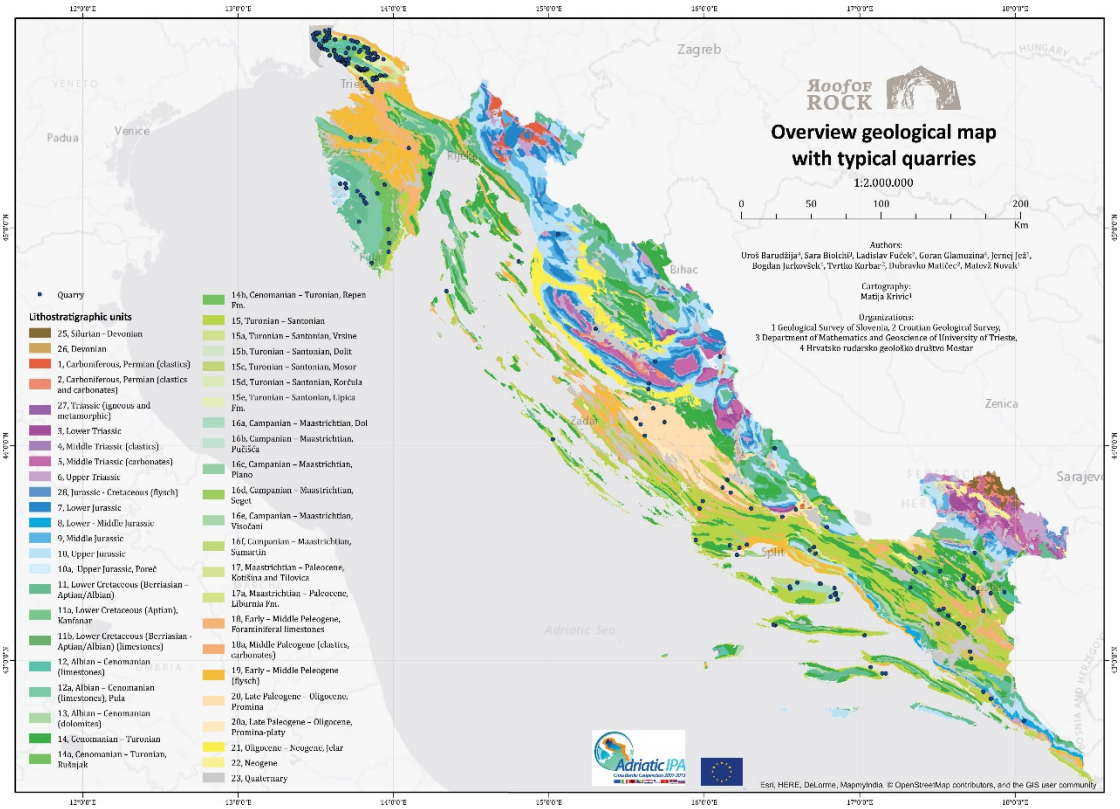

Figure 3. Overview geological map of the show case area with typical limestone quarries. Reproduced from Jež et al. (2015).

According to their potential as building limestone, geological units were classified into four categories (Figure 4):

1) No potential – the units which do not contain a significant proportion of limestone, e.g. flysch rocks.
2) Low potential – lower-quality limestone types, not commercially but only locally used.
3) Potential – relatively high-quality building limestone which could be commercially used, where abandoned quarries exist
4) High potential – widely commercially exploited limestone types

Types of platy limestone in the units classified as potential or high potential are listed along with their quarries in the database of most important building limestone types (Jež et al. 2015, Korbar et al. 2015, Novak et al. 2015b).

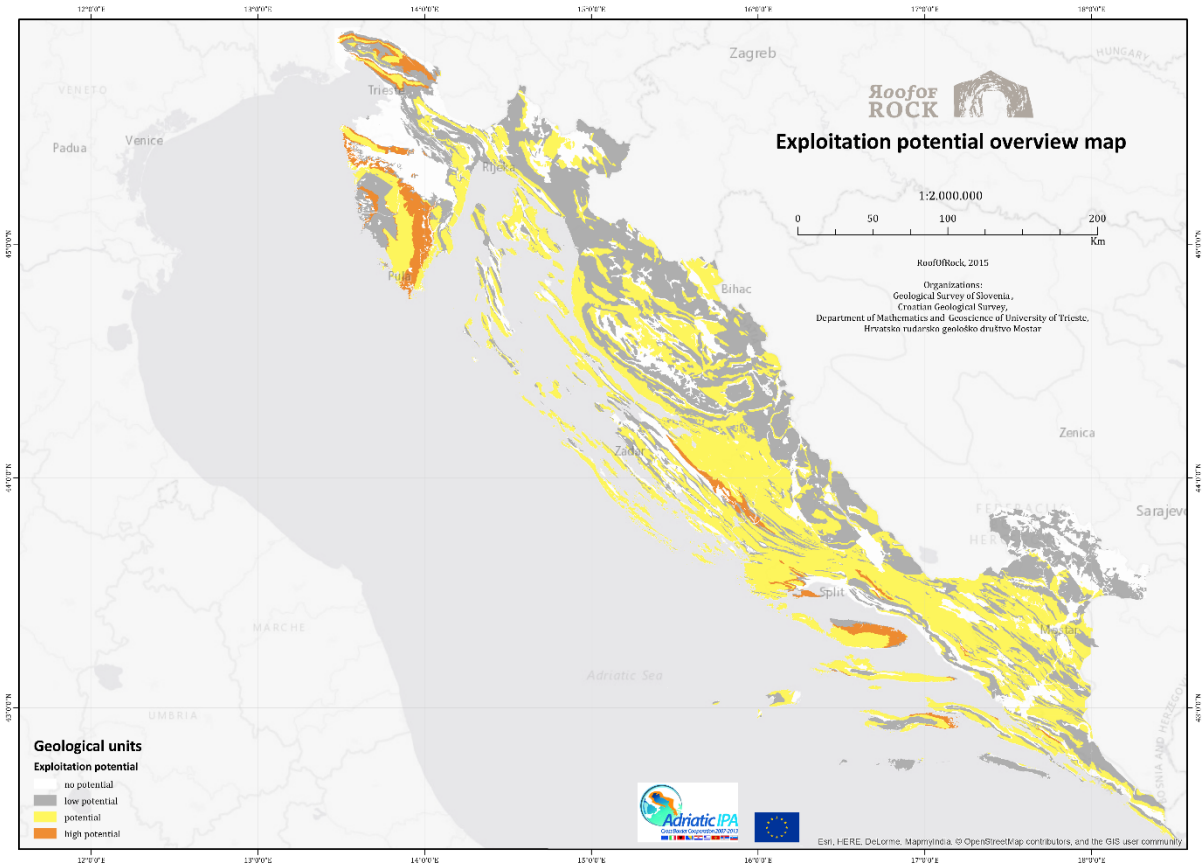

Figure 4. Map of geological unit exploitation potential for building limestone. Reproduced from Jež et al. (2015).

Provenance analysis of limestone used in selected objects

26 showcase objects were selected for the study of the use of limestone as building material. Among these, five were selected in Italy/Slovenia (Karst region), eleven in Croatia (five in Zadar County, three in Split-Dalmatia County and three in Dubrovnik-Neretva County) and one in Herzegovina. For five selected objects, source areas of building stone were examined in detail; four of these are located in Herzegovina-Neretva County and one in West Herzegovina County (Figures 5.1 to 5.6).

Figure 5.1. Showcase objects in Italy: (a) Karst House Museum, (b) Karst House, (c) Ljenčkica's House, (d) Saint Rocco and Saint Sebastiano Church, (e) Assumption of the Blessed Virgin Parish - Community's House. Reproduced from Novak (2015).

Figure 5.2. Showcase objects in Classical Karst, Slovenia: (a) Pr'Blaževih homestead, Gorenje, (b) Škrateljnova homestead, Divača, (c) Saint Elijah Parish church, Kopriva, (d) Church of the assumption of the blessed virgin, Gura, (e) Church of our Lady of the assumption, Šmarje. Reproduced from Novak (2015).

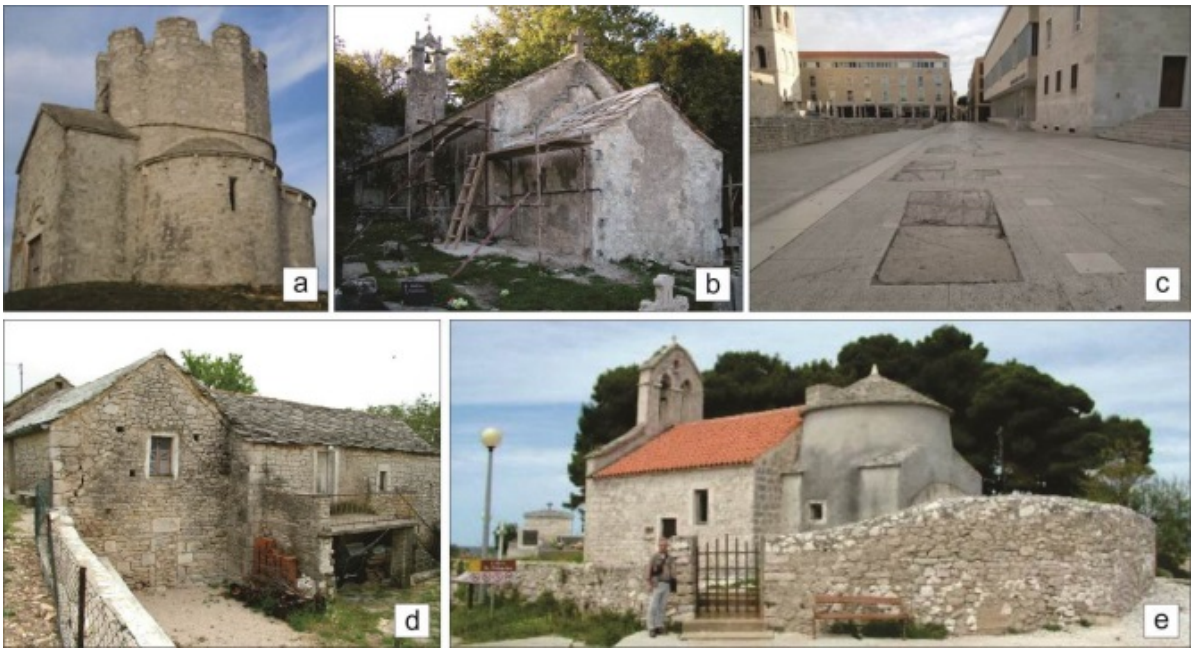

Figure 5.3. Showcase objects in Zadar County, Croatia: (a) Nin, (b) Medviđa, (c) Zadar, (d) Podgrađe, (e) Savar. Reproduced from Novak (2015).

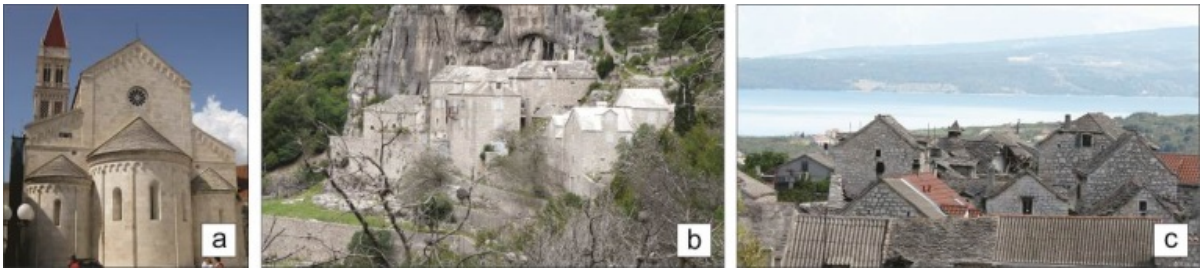

Figure 5.4. Showcase objects in Split-Dalmatia County, Croatia: (a) Trogir cathedral apses, (b) Blaca monastery, Brač, (c) "Ruića dvori" in Grohote, Šolta. Reproduced from Novak (2015).

Figure 5.4. Showcase objects in Dubrovnik-Neretva County, Croatia: (a) Vela Luka, (b) Žrnovo-Postrana, (c) Nakovana. Reproduced from Novak (2015).

Figure 5.4. Showcase objects in Dubrovnik-Neretva County, Bosnia and Herzegovina: (a) Biščevića house, Mostar, (b) Gavrankapetanovića Tower, Počitelj, (c) Velagića mills, Blagaj, (d) Mosque, Stolac, (e) Lalića Tower, Mostarska vrata. Reproduced from Novak (2015).

The geo-mapping of the stone-built cultural heritage included field work in selected areas, which provided a number of practical cases related to the use of stone. The representative objects were recorded according to architectural and conservation parameters (provenance/locations of the platy limestone used for various architectural elements on each building, its function, aesthetic value, state of conservation, state of deterioration, previous restoration interventions, etc.) A detailed geological census of all the types of limestone used was carried out for each object. The focus was on platy limestones for which source areas (quarries) were investigated (Figure 6). Geographic distances between the platy limestone sites and the selected objects were taken into account and the transport possibilities were estimated. Additionally, interviews with the owners of the objects and with local residents were conducted. The work was carried out in close cooperation with experts in cultural heritage conservation and architecture, especially concerning the selection of the showcase objects (Pieri and Biolchi 2014, Jež et al. 2015, Novak 2015, Novak et al. 2015a).

Figure 6. Provenance analysis of limestone made architectonic elements linked each limestone type with the mapped geological unit and, where possible, with its source quarry. Reproduced from Novak (2015).

Drafting the guidelines for legislative amendments

To bridge the conflict between natural and cultural heritage protection it was highly needed to develop common expert bases for changes in national legislation as well as technical guidelines and recommendations for the conservation, sustainable use and re-use of platy limestone as building material. The drafted guidelines and recommendations guide the user systematically through the investment process.

Firstly, the potential restrictions to be observed are outlined. Most are related to the geographical location of the object, including Natura 2000 sites, ecologically important areas, individual protected areas or other restrictions in areas of natural heritage (Figure 7). Restrictions are present with a brief description of the procedure for obtaining permits and the authority in charge for granting such permits. Furthermore, recommendations and guidelines for the sustainable extraction of platy limestone as a building material are presented. Some special cases here are also addressed, for example what to do when rare fossils are found. In addition, some objects and areas are protected as cultural monuments, thus cultural heritage aspects need to be taken into account as well.

The summary of general architectural solutions for objects built from platy limestone and the guidelines for appropriate integration of this stone into built objects is of special importance for potential investors.

A proposal is drafted for legislative amendments essential for preservation of natural and cultural heritage. With actual rigid legislation this is not possible. It should offer the owners and potential investors to legally obtain the bases for the maintenance, renovation or reconstruction of individual buildings, i.e. the required building material, which in this case is platy limestone. The final part of the Guidelines is intended for the policymakers with the ability to amend the existing rules, instructions, guidelines and restrictions (Novak 2015, Geological Survey of Slovenia 2016).

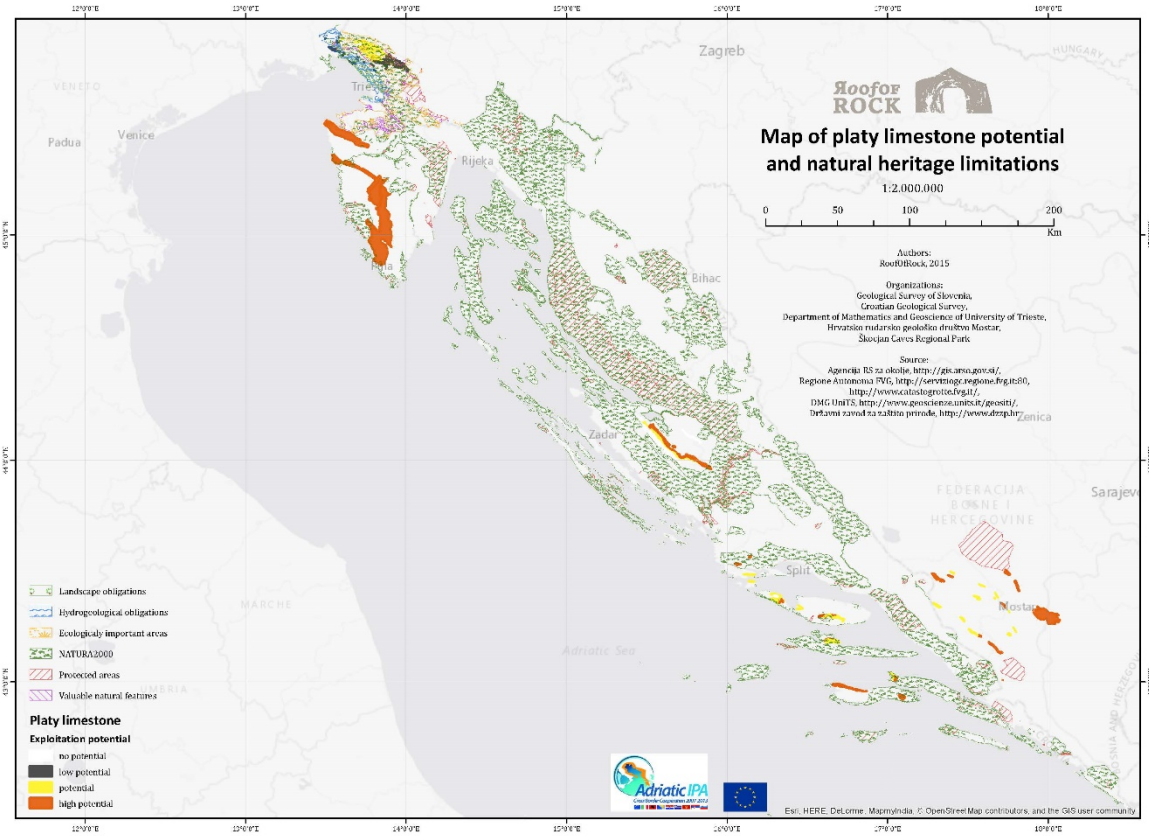

Figure 7. Map of platy limestone exploitation potential overlain with natural heritage limitations. Peternelj et al. 2015.

Case study results

Geological characterization of platy limestone, its occurrence and excavation potential, its use in architecture, natural and cultural heritage preservation, and related legislation were analysed in this case study to challenge the issues on the field of use of platy limestone for maintenance of cultural heritage and its preservation as natural heritage in countries of the Eastern Adriatic region. The results of the geo-mapping are presented in a web application and also as a mobile app that enables to acquire on site detailed data on limestone types in different architectural elements, occurrence of these limestones in nature, quarries and exploitation possibilities (Figure 8).

Figure 8: Screenshots from RoofOfRock geo-database and mobile and web applications.

Furthermore, a system of best practice protocols in identification, valorisation, promotion and sustainable use of natural stone as a building material was provided for further preparation of recommendations for legislative changes, all with one aim: to protect and preserve natural and cultural heritage.

On one hand, the professional guidelines provide important information for individuals, local authorities, professionals and institutions who live in areas with platy limestone or wish to restore existing buildings using this natural stone, and help them to understand the cultural heritage that arises from this. They bring back knowledge that has been lost in the past and can help to preserve the natural and cultural heritage for future generations. On the other hand, the guidelines can serve as a basis for all decision-makers at national and local level to draft laws that promote the sustainable use of platy limestone and other natural stones.

In karstic region limestone represents a common building material, especially for stone roofs, portals and paving, and quarrying is a century-old tradition. Sadly, the autochthonous stone is now being replaced by imported, sometimes even completely different type of stone or other material (e.g. tin roofs). However, there is a simple reason why investors and construction companies act like this. Since platy limestone, like all natural stones, is classified as a mineral resource, the legal basis for its extraction is the mining legislation. With the exception of a small part of Croatia and Herzegovina, on the Eastern Adriatic coast there are no quarries where mining rights could be acquired for the legal mining of platy limestone, which was traditionally used as a building material in karst architecture. According to the mining laws and related regulations in all four countries, the procedure for the legal exploitation of natural stone, including platy limestone, is rather complicated. For example, in Croatia, on most islands where platy limestone is abundant, there is a special restriction of all mining activities. In Bosnia and Herzegovina, the laws and regulations governing the commercial exploitation of mineral resources are not precisely defined. The results of this are numerous illegal small-scale mining sites.

Extraction of material from currently active quarries could be also the basis for a possible future use of limestone slabs for construction and reconstruction. Demonstration of this solution may be observed in the

case of Benkovac platy limestone also known as "Benkovac Stone". The stone is still commercially exploited in the quarries near Benkovac, the wider area of the city of Zadar, Croatia. It is mostly densely packed micrite and fine-grained calcarenite and as a such is of excellent quality, Benkovac platy limestone is used in the wider surroundings of Dalmatia and even in other parts of Croatia, since there are no other legal platy limestone quarries. Although, the Benkovac stones yellowish colour differ from other, mostly greyish lithotypes of the platy limestone. Each lithotype is specific for its cultural landscape in the immediate vicinity and thus geologists suggest the Benkovac limestone should be used only in the hinterland of Zadar. In other areas and regions, it would be more appropriate to use an autochthonous material.

Sustainable extraction of limestone plates

Summarizing the above, for sustainable extraction of limestone plates is suggested the following (Peternelj 2015, Peternelj et al. 2015, Geological Survey of Slovenia 2016), (Figure 9):

- Use of platy limestone from active extraction sites with mining rights.
- Limited acquisition of platy limestone from abandoned quarries only for the cultural heritage restoration purpose in the immediate vicinity.
- Providing of platy limestone directly from the surface only with hand tools, if possible.
- Use of appropriately crushed limestone from active quarries in the Karst region (Slovenia).
- Reuse of plates from existing objects, including deteriorated.
- Use of platy limestone from major construction work deposits.

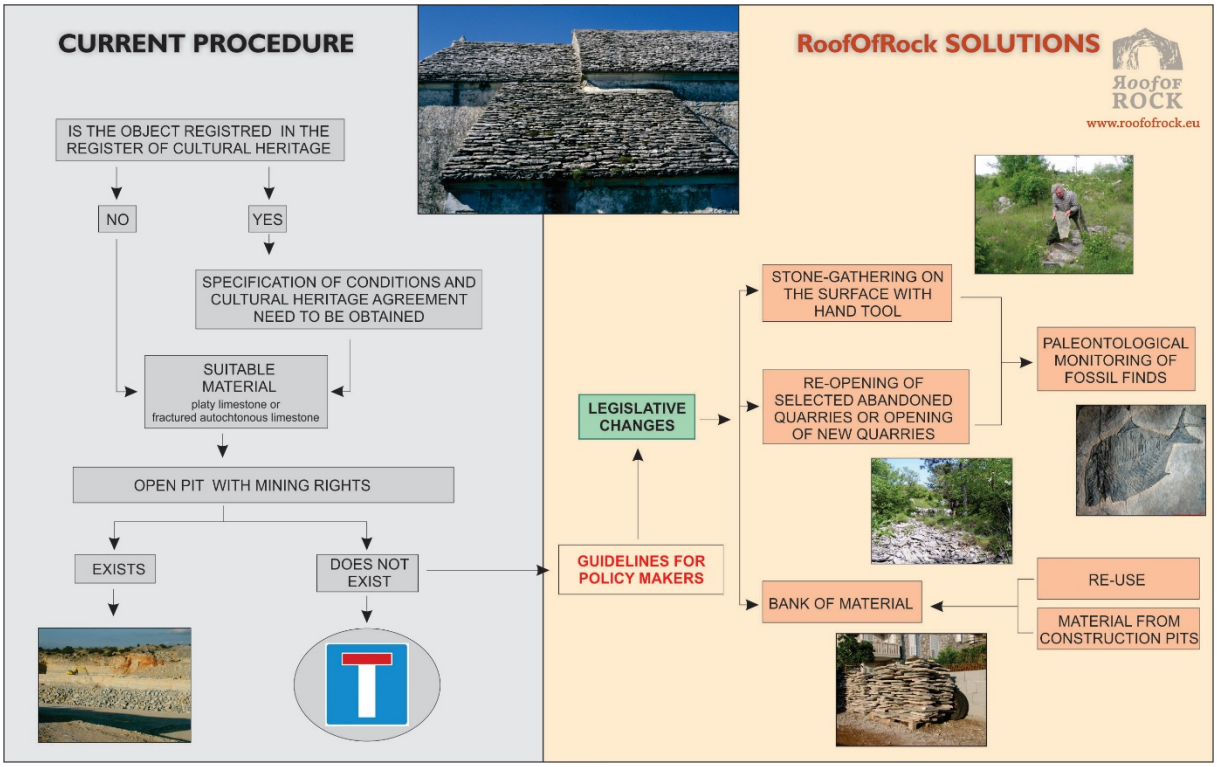

Figure 9. Schematic presentation of the procedure for the renovation of a stone roof, with recommendations to policy makers for legislative amendments. Reproduced from Novak (2015).

In the Slovenian mining legislation, natural stone is not classified as a mineral resource with special importance, as is the case of energy resources, defined as resources of strategic importance. In spite of that may national mining strategies define the exploitation of certain types of mineral resources as of public interest and strategically important for economic and social development. Moreover, autochthonous mineral resources used as building materials are often part of the national identity and present cultural and natural heritage (Peternelj 2015, Peternelj et al. 2015, Geological Survey of Slovenia 2016).

Local, regional and national authorities should initiate procedures to integrate abandoned extraction sites into local and regional spatial plans. Such sites should also be identified as potential extraction sites for a certain quantity of raw materials when amending mining regulations. Extracted raw material should only be used for the restoration of objects listed in the national or local register of cultural heritage.

Furthermore, it is recommended that small-scale excavations with simple hand tools - excluding machines - for the renovation of existing traditional objects should be legalized by local authorities as a traditional activity. It is necessary to refer to the current regulations for the collection of construction waste. It would be reasonable to specify the possibility of collecting and sorting natural stone in predetermined places and the rules applicable to the use of this material. It is proposed that national regulations should allow reusing of natural stone as a building material for restoration of protected objects and in proclaimed cultural landscapes where authenticity is the main objective.

The legal status of platy limestone as building material is not recognized in any country as a standardized construction product that could be placed on the market for construction products. Alternative legal options for the use of this material in construction (e.g. re-use) should be created. It is important that a product or material has a CE certificate, since it can only be marketed throughout the EU on the basis of this certificate. The procedure for obtaining the certificate is complex and time-consuming. Since platy limestone is not a desired material for manufacturers to initiate procedures for obtaining the CE certificate, we proposed the use of national technical approval. In this case, it is proposed to establish the ''Bank for building materials'' at some collection points regulated by environmental and technical standards and where this material will be made available to the market (Šolc et al. 2014, Novak 2015, Peternelj 2015, Peternelj et al. 2015, Geological Survey of Slovenia 2016).

Finally, in all countries along the Eastern Adriatic coast an extensive public awareness campaign took place. The campaign included workshops, lectures and demonstrations (Figure 10). Such actions helped raise awareness among the broader public and key local stakeholders about all aspects of sustainable use of platy limestone and its further exploitation, as well as the importance of preserving the natural and cultural heritage.

Figure 10. Workshops on proper use of platy limestone. Courtesy of RoofOfRock project partners.

Case study conclusions

Platy limestone of the Eastern Adriatic coast should be properly preserved by using it responsibly in the future. Sustainable stone use will than help to enhance commercial activities related to stone extraction and keep the character of the area. Legislative changes will make the local natural stone available for well-planned restorations in the region.

Therefore, a suggestion of this case study is to amend or supplement the mining legislation while selected areas must be determined and protected as cultural landscape sites. This would aloud a one-off extraction of natural stone in a particular volume for renovation of cultural heritage objects in a protected landscape site. Definition, protection and small-scale extractions of such stone deposits could be arranged in national strategies to help preserve the autochthonous karst architecture.

Following document was drafted to better convey these recommendations – a White Paper *Sustainable Tourism: Opportunity for Heritage Protection*. *Towards Legislative Changes Needed to Protect the Stone Heritage in the Adriatic-Ionian Macro-Region*. The signing parties especially wish to address and caution the representatives of ministries, regional or local governments and the institutions tasked with the protection of natural and cultural heritage – i.e. anyone who is in any way involved in the decision-making process. The authors of the document want to draw attention to the urgency of the amendment of legislation in the area of the extraction and use of natural stone as a building material if the stone-built cultural heritage is to be preserved, renovated and maintained.

The educational program for broader public has formed the foundation for future projects and activities that will acquaint people with the sustainable use of this precious natural stone.

References

Cosi M, Primavori P (2016) Dimension Stones, a unique and attractive sector for international institutions and private investors: Outcomes from the International Conference STONECHANGE 2016 as a first step for the necessary future international cooperation. European Geologist Journal 42, – International cooperation on raw materials, p 29–31

Čebron Lipovec N, Guštin M, Šmid K, Biolchi S, Premrl B, Preložnik A, Bubalo F, Dodig R, Orbanić B, Pieri F, Pranjić S, Torbica A, Vojnović I, Zubin Ferri T (2015) Cultural heritage and limestone along the Eastern Adriatic coast. In: Novak M et al (eds) Roof of rock. Geological Survey of Slovenia & DUNEA LLC, Dubrovnik, p 13–69

Everett P (2017) Applying geological knowledge and skills to confront challenges in built heritage conservation: experiences of the British Geological Survey's Building Stones Team in Scotland. In: Přikryl R (ed) Book of abstracts and schedule of events, International conference on Natural stone for cultural heritage: local resources with a global impact, Sept 18–22, 2017, Prague, p 18

Geological Survey of Slovenia (2016) White paper Sustainable tourism: Opportunity for heritage protection. Towards legislative changes needed to protect the stone heritage in the Adriatic-Ionian macro-region. AdriaWealth Project document, August 2016, Ljubljana

Heldal T (2017) Natural stone value assessment: problems and possible solutions. In: Přikryl R (ed) Book of abstracts and schedule of events, International conference on Natural stone for cultural heritage: local resources with a global impact, Sept 18–22, 2017, Prague, p 9

Hyslop E (2017) Stone resources for the management of cultural heritage in Scotland: a national perspective on global issues. In: Přikryl R (ed) Book of abstracts and schedule of events, International conference on Natural stone for cultural heritage: local resources with a global impact, Sept 18–22, 2017, Prague, p 16

Jež J, Jurkovšek B, Korbar T, Fuček L, Barudžija U, Glamuzina G, Biolchi S, Devoto S (2015) Platy limestone. Geological history and its reflection in the cultural landscape. In: Novak M et al (eds) Roof of rock. Geological Survey of Slovenia & DUNEA LLC, Dubrovnik, p 71–123

Korbar T, Jež J, Glamuzina G, Fuček L, Jurkovšek B, Matičec D, Barudžija U, Krivic M, Kurtanjek N (2015) Pločasti vapnenci Jadranskoga krša (Platy limestones of the Adriatic karst region). In: Horvat M, Wacha L (eds) Knjiga sažetaka = Book of abstracts, Hrvatski geološki institut, Zagreb, 2015, p 132

Novak, M (ed) 2015: RoofOfRock Final Thematic Report. Geological Survey of Slovenia. https://roofofrock.geo-zs.si/Publication/index.html. Accessed 16 October 2020

Novak M, Biolchi S, Čebron Lipovec N, Jež J, Peternelj K, Šolc U (eds.) (2015a) Roof of rock. Geological Survey of Slovenia & DUNEA LLC, Dubrovnik, p 183.

Novak M, Bavec M, Šolc U, Jež J, Jurkovšek B, Kolar-Jurkovšek T, Rokavec D, Krivic M, Guštin M, Cucchi F, Furlani S, Devoto S, Biolchi S, Peternelj K, Zubin Ferri T, Korbar T, Fuček L, Barudžija U, Glamuzina G (2015b) Limestone as the common denominator of natural and cultural heritage along the karstified part of the Adriatic coast – Project RoofOfRock. In: Horvat M, Wacha L (eds) Knjiga sažetaka = Book of abstracts, Hrvatski geološki institut, Zagreb, 2015, p 194

Novak M, Jež J, Šolc U, Bavec M (in press) The conflict between natural and cultural heritage protection: the case of platy limestone, a characteristic element of cultural landscape along the Eastern Adriatic coast. In: Přikryl R (ed) Natural stone for cultural heritage. Springer, accepted 2020, in press.

Peternelj K (ed) (2015) Common guidelines and recommendations for changes to legislation. Project publication, Dunea, Dubrovnik

Peternelj K, Alaber S, Bavec M, Devoto S, Furlani S, Glamuzina G, Jež J, Korbar T, Novak M, Oven M, Perissinotto ML, Pieri F, Rokavec D, Stanič I, Zupančič D (2015) Legislative framework. Guidelines and recommendations for changes to legislation. In: Novak M et al (eds) Roof of rock. Geological Survey of Slovenia & DUNEA LLC, Dubrovnik, p 149–177Pieri and Biolchi 2014

RoofOfRock Web Portal: https://roofofrock.geo-zs.si/Publication/index.html

Šolc U, Jež J, Novak M, Rokavec D, Peternelj K, Krivic M, Jurkovšek B, Kolar-Jurkovšek T, Bavec M (2014) Projekt RoofOfRock – usmeritve in priporočila za ohranjanje, sonaravno uporabo in ponovno uporabo ploščastega apnenca kot naravnega mineralnega vira za gradnjo objektov. Mineralne surovine v letu 2013 11(1):124–130