Croatian stone in Zagreb : [booklet]

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Croatian Stone in Zagreb

Hrvatski kamen u Zagrebu

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Historical Mining – Tracing and Learning from Ancient Materials and Mining Technology

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Croatian stone

Croatia has a long tradition of stone exploitation and usage. From antiquity, through the Middle Ages to present day, a high-quality sedimentary rocks, mostly limestone, have been exploited and used for many old cities and monuments. There are 44 different varieties of natural stone excavated in Croatia. Magmatic and metamorphic rock are exploited only as aggregates [1, 2, 3].

Old Croatian cities / Stari gradovi u Hrvatskoj

Pula

Split

Dubrovnik

Korčula

Hrvatski kamen

Hrvatska ima dugu tradiciju vađenja i primjene kamena. Od antike, preko srednjeg vijeka do danas, eksploatiraju se visokokvalitetne sedimentne stijene, uglavnom vapnenci, koji su upotrijebljeni u mnogim starim gradovima i spomenicima. U Hrvatskoj se vade 44 različite vrste prirodnoga kamena. Magmatske i metamorfne vrste stijena se vade samo u obliku agregata [1, 2, 3].

Natural stone

STONE is the most important mineral raw material in Croatia. NATURAL STONE (building stone, dimension stone) is applied where decorative and protective demands must be satisfied. It is used in the fine arts for sculpting, and masonry as well. Natural stone varieties, labelled as "marbles" on the market, are exploited in the shape of stone blocks or monoliths, but also as thin slabs [1, 2, 3].

Kanfanar, Istria — natural stone quarry and underground pit / Kanfanar, Istra — kamenolom i podzemni kop prirodnoga kamena

Prirodni kamen

KAMEN je najvažnija mineralna sirovina u Hrvatskoj. PRIRODNI KAMEN (građevinski kamen, ukrasni kamen) primjenjuje se tamo gdje moraju biti zadovoljeni dekorativni i zaštitni zahtjevi. Osim toga, koristi se u umjetnosti za kiparstvo i zidarstvo. Varijeteti prirodnog kamena, na tržištu označeni kao „mramori", iskorištavaju se u obliku kamenih blokova ili monolita, ali i u obliku tankih ploča [1, 2, 3].

Istrian Yellow

Istrian Yellow, also called Giallo d'Istria, is brownish-yellow oncolytic limestone from Istria. Exploitation of this very decorative stone dates back to the 15th century when, under the management of Juraj Dalmatinac, it was transported from the Brijuni Islands to the city of Ancona in central Italy. Today in the Kanfanar Quarry this stone variety is exploited by underground excavation. It was used for interior of the Vienna Parliament (Austria) and in Krasnodar Park, Krasnodar (Russia). In Zagreb, it is mostly used in interiors, but it also used as pedestal base of lamps in front of the Croatian National Theatre.

Base of a lamp in front of the Croatian National Theatre / Stup ispred Hrvatskog narodnog kazališta

Istrian Yellow limestone / Istarski žuti vapnenac

Istarski žuti

Istarski žuti („Giallo d'Istria") je smeđe-žuti onkolitni vapnenac iz Istre. Ovaj ukrasni kamen se eksploatira od 15. stoljeća kada je pod upravom Jurja Dalmatinca prevezen s Brijuna u grad Anconu u središnjoj Italiji. Danas se u kamenolomu Kanfanar ovaj varijetet kamena vadi metodom podzemnih iskopa. Upotrijebljen je za interijer austrijskog parlamenta (Beč, Austrija) i u Parku Krasnodar (Krasnodar, Rusija). Iako se u Zagrebu pretežno koristi za uređenje interijera može se naći baznim dijelovima stupova ispred Hrvatskog narodnog kazališta.

Veselje

Veselje unito and fiorito are two white limestone varieties from the island of Brač with visible fragments of rudist shells. Unito is excellent for carving and it was used as the main sculpturing material in the Stonemasons' school in Pučišća, Brač. "Veselje unito" is often misnamed as "Brač marble". It was used for the Diocletian Palace and the Meštrović Gallery in Split, the Cathedral in Šibenik, the Croatian Association of Artists and the Croatian National Bank building in Zagreb, as well as the facade of Faculty of Mining, Geology and Petroleum Engineering.

Façade on the Faculty of Mining, Geology and Petroleum Engineering building / Fasada zgrade Rudarsko-geološko-naftnog fakulteta

Microphotography of Veselje limestone / Mikrofotografija vapnenca Veselje

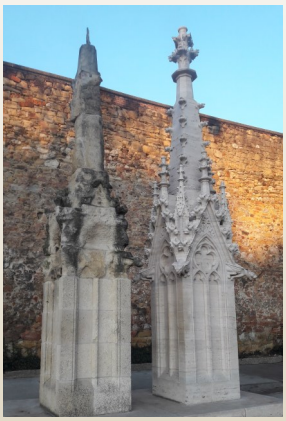
Croatian Association of Artists building / Zgrada Hrvatskog društva likovnih umjetnika

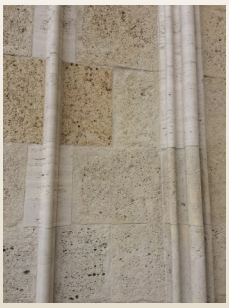
Veselje

Veselje unito i fiorito dva su varijeteta bijelog vapnenca s otoka Brača s vidljivim ulomcima školjki zvanih rudisti. Unito je pogodan za izradu skulptura te se koristi kao glavni kiparski materijal u Klesarskoj školi u Pučišćima na Braču. „Veselje unito" se često pogrešno naziva „brački mramor". Kamen je upotrijebljen za izgradnju Dioklecijanove palače i Galerije Meštrović u Splitu, Katedrale u Šibeniku, zgrade Hrvatskog društva likovnih umjetnika i Hrvatske narodne banke u Zagrebu, te fasade Rudarsko-geološko-naftnog fakulteta.

Lithothamnium limestone

Lithothamnium limestone and litavac are named after corallinacean algae (mostly *Lithothamnium*). Many other fossils are present, including bryozoan fragments, bivalves, echinoderms and foraminifera. Its composition and high porosity make this stone prone to chemical weathering and mechanical damage. Many monuments in Zagreb, such as the Cathedral and St. Mark's Church are built of it. During the restoration of the Zagreb Cathedral, blocks made of Lithothamnium limestone are commonly replaced with travertine replicas.





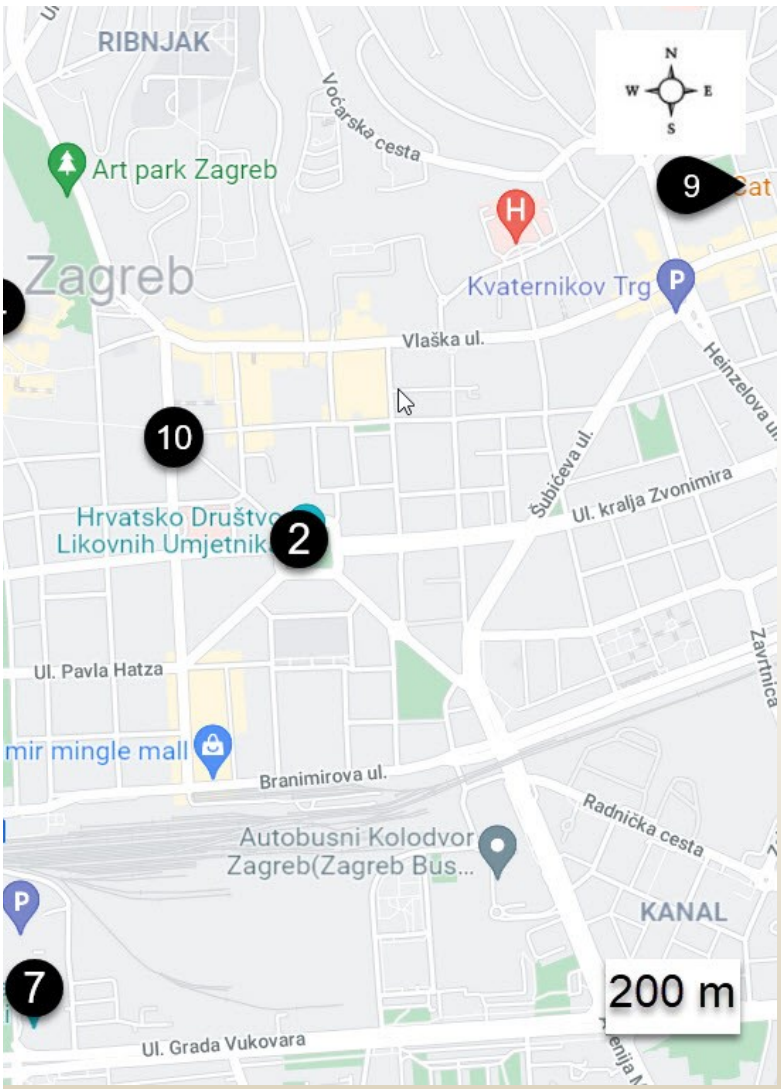
Lithothamnium limestone and litavac stone / Litotamnijski vapnenac i litavac

Litotamnijski vapnenac

Litotamnijski vapnenac i litavac nazvani su po koralinskim algama (uglavnom *Lithothamnium*). U kamenu nalazimo i mnogobrojne fragmente, ili rjeđe cjelovito očuvane ostatke organizama, poput mahovnjaka, školjkaša, bodljikaša i foraminifera. Sastav i visoka poroznost čine kamen podložnim kemijskom trošenju i mehaničkom oštećenju. Od njega su izgrađeni brojni zagrebački spomenici poput katedrale i crkve sv. Marka. Tijekom obnove katedrale blokovi od litotamnijskog vapnenca često se zamjenjuju replikama načinjenim od travertina.

Zagreb city map (Google Maps) with locations of famous buildings with Croatian stone [4] / Karta Zagreba (Google maps) s označenim lokacijama [4]

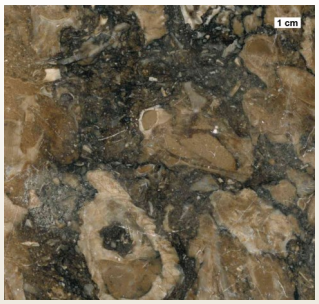
1) The Croatian National Theatre
2) The Croatian Association of Artists
3) The Faculty of Mining, Geology and Petroleum Engineering
4) Zagreb Cathedral
5) St. Mark's Church
6) The NAMA department store
7) Vatroslav Lisinski Concert Hall
8) Croatian Postal Bank
9) Zagreb ZOO (not on the map)
10) Croatian National Bank

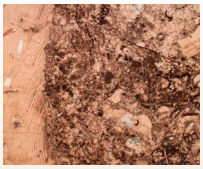


1) Hrvatsko narodno kazalište
2) Hrvatski dom likovnih umjetnika
3) Rudarsko-geološko-naftni fakultet
4) Zagrebačka katedrala
5) Crkva sv. Marka
6) Robna kuća NAMA
7) Koncertna dvorana Vatroslav Lisinski
8) Hrvatska poštanska banka
9) Zagrebački ZOO (nije na karti)
10) Hrvatska narodna banka

Rasotica

Dark brown limestone contains visible fragments of rudist shells. The stone is very decorative due to the various sizes and cross cuts of rudist (usually light coloured) and the dark matrix rich in organic component. This stone is suitable for interior decoration because exterior application leads to the discoloration of dark matrix due to oxidation. It is used as a wall decoration in the NAMA department store and as a decoration of the exterior and interior of the Vatroslav Lisinski Concert Hall in Zagreb.





Microphotograph of Rasotica limestone / Mikrofotografija Rasotice

Façade of the Vatroslav Lisinski Concert Hall building / Fasada zgrade Koncertne dvorane Vatroslava Lisinskog

Rasotica

Rasotica je tamnosmeđi vapnenac s ulomcima rudistnih školjkaša. Kamen je vrlo dekorativan zbog izmjene veličina i poprečnih prereza rudista (obično svijetle boje) i tamnog matriksa bogatog organskom komponentom. Kamen je pogodan za unutarnje uređenje jer vanjska primjena dovodi do promjene boje tamnog matriksa zbog oksidacije. Upotrijebljen je za dekorativno oblaganje na zidu robne kuće NAMA te zidovima eksterijera i interijera Koncertne dvorane Vatroslava Lisinskog u Zagrebu.

Romanovac

Reddish to greyish limestone breccia is clastic sedimentary rock. The clasts are whitish to greyish whereas the matrix is reddish to brownish. It is a very decorative stone variety because of its colour and structure, but it is recommended for interior vertical and horizontal surfaces, while horizontal corridors may be exposed only to moderate pedestrian traffic. It is used on the ventilated facade of the Croatian Postal Bank in Jurišićeva Street, Zagreb.

Façade of the Croatian Postal Bank / Fasada zgrade Hrvatske poštanske banke

Romanovac breccia / Romanovac breča

Romanovac

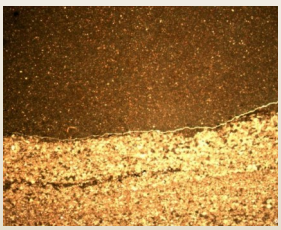
Crvenkasta do sivkasta vapnenačka breča je vrsta klastične sedimentne stijene. Klasti su bjelkasti do sivkasti, dok je matriks crvenkast do smećkast. Vrlo je dekorativan varijetet kamena zbog svoje boje i strukture, ali se preporučuje za unutarnje vertikalne i horizontalne površine, dok horizontalni hodnici mogu biti izloženi samo umjerenom pješačkom prometu. Upotrijebljen je na ventiliranoj fasadi Hrvatske poštanske banke u Jurišićevoj ulici u Zagrebu.

Benkovac stone

Yellowish platy limestone is excavated near the city of Benkovac. Its decorative features, durability and easy processing enable its wide application. It is used as roof tiles, for horizontal and vertical application on external or internal surfaces, for wall masonry, etc. Stone is used traditionally and many old houses and buildings in the surrounding areas of Benkovac are made of it. Nowadays, it is recognized as a "brand" in the stone industry. It is used in the pedestrian zone of the Zagreb ZOO.

Benkovac stone / Benkovački kamen

Benkovac stone in the pedestrian zone of the Zagreb ZOO / Benkovački kamen na pješačkoj zoni u ZOO vrtu



Microphotograph of Benkovac stone / Mikrofotografija Benkovačkog kamena

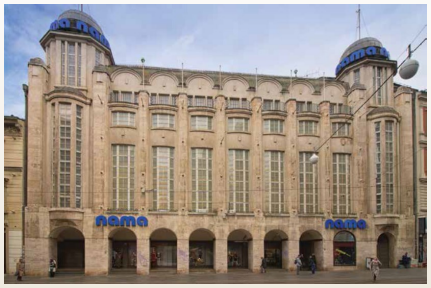
Benkovački kamen

To je žućkasti pločasti vapnenac koji se vadi u blizini grada Benkovca. Dekorativna svojstva, izdržljivost i jednostavna obrada omogućuju njegovu široku primjenu. Koristi se u obliku ploča za krov, za horizontalnu i vertikalnu primjenu na vanjskim i unutarnjim površinama te za zidanje zidova. Koristi se tradicionalno te su od njega napravljene mnoge stare kuće i zgrade u okolici Benkovca. Danas je prepoznat kao „brend" u kamenoklesarskoj industriji. Ovim kamenom je popločena pješačkoj zona ZOO-a u Zagrebu.

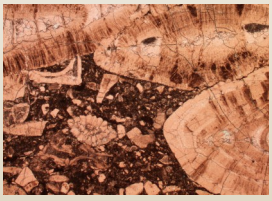
Istranka

This limestone from Istria consists of large bentic foraminifera (dominantly *Nummulites*) in a dark matrix. Various orientation (crosscuts) of the foraminifera can be observed where the lime matrix is enriched in organic components and is therefore significantly darker than the foraminifera. Due to the abundant organic-rich matrix, this stone is easily subjected to oxidation and colour fading that results in its diminished decorativity. Parts of the front entrance to the NAMA department store in Zagreb are made of this stone.

Istranka limestone / Vapnenac Istranka



The front entrance to the NAMA department store / Prednji ulaz u zgradu NAME



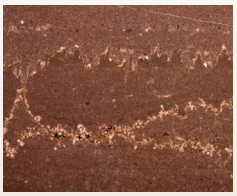
Microphotography of Istranka limestone / Mikrofotografija vapnenca Istranka

Istranka

Ovaj vapnenac iz Istre sastoji se od velikih bentičkih foraminifera (pretežno *Nummulita*) u tamnom matriksu. Vapnenac je obogaćen organskom tvari koja boji matriks u tamne tonove u kojima se ističu svijetle kučice foraminifera. Ovaj kamen lako oksidira i boja izblijedi što rezultira smanjenom dekorativnošću. Od ovog kamena izrađeni su dijelovi prednjeg ulaza u robnu kuću NAMA u Zagrebu.

Kirmenjak avorio

Limestone with stylolites from Istria is a high quality natural stone. It was used in Venice for the construction of the Ducal Palace, Ponte di Rialto and Ponte della Costituzione and in the Theodoric Mausoleum in Ravenna. This stone has been used exclusively for basal zones of buildings located between wooden piles and brick walls. Due to its low porosity and water absorption, it protects buildings from humidity. This stone showed high resistance to constant exposure to sea salt and tidal wetting and drying cycles. It is used on the paved area in front of the NAMA store in Zagreb.



Kirmenjak avorio in the paved area in front of the NAMA store / Kirmenjak avorio na podu ispred robne kuće NAMA

Microphotography of Kirmenjak avorio limestone / Mikrofotografija vapnenca Kirmenjak avorio

Kirmenjak avorio

Istarski vapnenac sa stilolitima je visokokvalitetni prirodni kamen. U Veneciji se koristio za vojvodsku palaču, Ponte di Rialto i Ponte della Costituzione te u Teodorikovom mauzoleju u Ravenni. Kamen se u Veneciji koristio isključivo u temeljima zgrada, između drvenih pilota i zidova od opeke, zbog svoje niske poroznosti i upijanja vode te visoke otpornosti na stalnu izloženost morskoj soli, ciklusima vlaženja i sušenja. Upotrijebljen je kao podna obloga ispred robne kuće NAMA u Zagrebu.

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[4] Zagreb u kamenu (geoloskasetnjazagreb.com)

Quarries in Croatia / Kamenolomi u Hrvatskoj

Pučišća, Island of Brač / Pučišća, Brač

Kanfanar, Istria / Kanfanar, Istra

Benkovac / Benkovac

Pučišća, Island of Brač / Pučišća, Brač

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