Natural stone : famous natural stone varieties in Croatia : [poster]

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NATURAL STONE
Famous natural stone varieties in Croatia

Istranka, micro

Istranka, macro

NAMA department store in Zagreb

Variety: Istranka
Age: Eocene

Petrography:
Nummulitic limestone – numulitic packstone/floatstone – biomicrite/biomicrudite.

This limestone type consists of larger bentic foraminifera (dominantly *Nummulites*) in a dark micritic or fine-grained lime matrix. Various orientation (crosscuts) of foraminifera can be observed. Lime matrix is enriched in organic component therefore significantly darker than foraminifera tests.

Properties:
Due to abundant organic-rich matrix this stone is easily subjected to oxidation and colour fading that result in diminished decorativity.

Monuments:
- Parts of front entrance of NAMA department store in Zagreb

Interesting facts:
Installation in interior or other protected areas is recommended. There is no active quarry nowadays.

Lithothamnium limestone

Lithothamnium limestone

Lithothamnium limestone, macro

The Zagreb Cathedral

Lithothamnium limestone pillar (left) and travertine pillar (right)

Variety: *Lithothamnium* limestone
Age: Middle Miocene/Badenian

Petrography:
Lithothamnium limestone – packstone/grainstone/floatstone/rudstone – biomicrite/biosparite/biomicrudite/biosparrudite; (sometimes also named biocalcarenite and biocalcrudite). *Lithothamnium* limestone variety dominantly consists of medium to coarse grained bioclastic detritus dispersed in micritic matrix or cemented with sparry calcitic cement. The dominant bioclastic component is represented by fragments of corallinacean algae (mostly *Lithothamnium*) and subordinate presence of bryozoan fragments, bivalves, echinoderms and foraminiferas. Varying amount of siliciclastic component is usually present.

Properties:
Composition and high porosity makes *Lithothamnium* limestone prone to chemical weathering and mechanical damage.

Monuments:
- The Zagreb Cathedral
- St. Mark's Church

Interesting facts:
During the restoration of Zagreb Cathedral, blocks made of *Lithothamnium* limestone are commonly replaced with travertine replicas.

Romanovac, micro

Romanovac, macro

HPB in Jurišićeva Street, Zagreb

Variety: Romanovac
Age: Early Cretaceous

Petrography:
Clastic sedimentary rock – red to greyish limestone breccia. Clasts are whitish to greyish whereas the matrix is reddish to brownish. This monomictic breccia is composed of poorly sorted angular limestone/dolostone fragments (light coloured) and lime matrix (reddish to brown). Within the fragments there are numerous micro-cracks, possibly formed as a consequence of brecciation and subsequently filled with white calcitic cement.

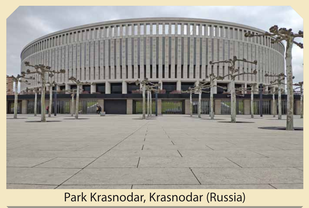
Properties:
The Romanovac breccia is reccomended for interior vertical and horizontal surfaces while horizontal coridores may be exposed only to moderate pedestrian traffic.

Monuments:
- Ventilated facade of Hrvatska poštanska banka (HPB) in Jurišićeva Street, Zagreb

Interesting facts:
Very decorative stone variety because of its colour and structure.

Istrian Yellow, micro

Istrian Yellow, macro


Park Krasnodar, Krasnodar (Russia)

Variety: Istrian Yellow / Giallo d'Istria
Sub-varieties: Kanfanar, Selina, Korenići
Age: Early Cretaceous (Early Aptian)

Petrography:
Brownish-yellow oncolytic limestone (oncoid floatstone) with large (mm- to cm-size) oncoids in a micritic matrix. Significant is the presence of *Bacinella irregularis* (RADOIČIĆ) microproblematica forming oncoids slightly darker in colour related to the matrix. Lime mud rich interalayers (mudstone) often alternate with oncolithes. Late diagenetic stylolitic seams of small amplitudes occur along the oncoids' edges, or at the border between the oncolitic and mudstone interlayers.

Properties:
Properties of the stone are influenced by stylolites which are well bounded and could present water passage.

Monuments:
- Interior of Vienna Parliament (Austria) (new project from 2020)
- Park Krasnodar, Krasnodar (Russia)
- Europa-park Colosseo, Freiburg (Germany)
- Szt. Istvan Szobor Square, Budapest (Hungary).

Interesting facts:
Exploitation of this very decorative stone dates to the 15th century when, under the management of Juraj Dalmatinac, it was transported from the Brijuni Islands (St. Jerolim Island) to the City of Ancona in central Italy. Today in the Kanfanar quarry this stone variety is exploited by underground excavation method.

Croatia has a long tradition of stone exploitation. From antiquity, through the Middle Ages, to present day, high-quality sedimentary type of rocks, mostly limestone, have been exploited. There are 44 different varieties of natural stone excavated in Croatia as marketable stone blocks. Magmatic and metamorphic rock varieties are not exploited in Croatia as natural stone.

Other valuable examples of Croatian natural stone are:

- **Lipovec dark** (Samoborsko Gorje Hills)
- **Dračevica, Sivac, Zečevo, Oklad** (Island of Brač)
- **Grožnjan, Valtura, Vinkuran, Planik** (Istria)
- **Plano, Seget, Vrsine,** **Jadran zeleni, Fantazija, Dolit,** **Mironja, Visočani** (Dalmatia)
- **Multikolor, Alkasin** (Sinj, Central Dalmatia)
- **San Antonio, Vrnik** (Isle of Korčula)

Benkovac stone, micro

Benkovac stone, macro

Benkovac stone, build in

Variety: Benkovac stone / Benkovački pločasti
Age: Upper Eocene

Petrography:
Yellowish platy limestone deposited as part of Promina beds. Two different lithotypes are distinguished as tabular interlayers/laminae:
- grainy (predominantly made of carbonate grains),
- micritic (consists of thick micritic layers).

Properties:
Decorative features, durability and easy processing enable wide application e.g. as roof tiles, for horizontal and vertical application on external or internal surfaces, for wall masonry etc.

Monuments:
- many old houses and buildings in Benkovac surroundings
- parts of pedestrian zone in the Zagreb ZOO

Interesting facts:
Stone is used traditionally and nowadays is recognized as a "brand" in the stone industry.

Kirmenjak, micro

Kirmenjak, macro

Venice, Rialto Bridge & basal parts of buildings

Variety: Kirmenjak / Avorio / Pietra d'Istria / Orsera
Sub-varieties: Kirmenjak dark, Kirmenjak light
Age: Late Jurassic

Petrography:
Stylolitic limestone – dense mudstone with stylolites – micritic limestone with pronounced stylolites.

Properties:
High quality construction material due to its homogenous micritic composition and extremely low porosity. High density lime mud and closed stylolites with clayey residue accumulated within contribute to low porosity and low capillary water absorption of this stone variety.

Monuments:
- can be found in Venice (e.g. the Ducal palace and Ponte di Rialto, Ponte della Costituzione)
- Basilica in Poreč
- the Theodoric Mausoleum in Ravenna
- the bell tower in Ferrara
- the bridge in Rimini
- the basilica in Bologna

Interesting facts:
Stone with horizontally oriented stylolites have been used exclusively for basal zones of buildings, between wooden piles and brick walls, in Venice due to its low porosity and resistance to constant exposure to sea salt, tidal wetting and drying cycles.

Unito, micro

Fiorito, micro

Veselje Unito

Veselje Fiorito

Stonemasons' school in Pučišća

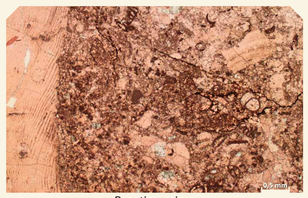
Variety: Veselje
Sub-varieties: Unito and Fiorito
Age: Late Cretaceus

Petrography:
White rudist limestone – rudist packstone/floatstone – biomicrite/biomicrudite. Sub-variety "Unito" is a packstone/biomicrite that dominantly consists of small (1-2 mm) fragments of rudist shells homogeneously distributed in micritic matrix. Sub-variety "Fiorito" represent a floatstone/biomicrudite containing rudite size (> 2 mm) biodetritus (dominantly rudists) in lime matrix.

Properties:
Favourable for indoor use. Relatively big porosity, water absorption and lesser abrasion resistance imply that this stone variety should not be used in wet areas and areas with increased traffic.

Monuments:
- Croatian Association of Artists and Croatian National Bank in Zagreb
- Diocletian Palace and Meštrović Gallery in Split
- Cathedral in Šibenik
- Budapest Parliament
- Stonemasons' school in Pučišća, etc. Front wall of our Faculty is sheathed with "Veselje unito".

Interesting facts:
This stone variety is excellent for carving. Sub-variety "Veselje unito" is often missnamed "Brač marble".


Rasotica, micro

Rasotica, macro

Wall in Vatroslav Lisinski Concert Hall, Zagreb

Variety: Rasotica
Age: Late Cretaceous

Petrography:
Dark brown rudist limestone – rudist boundstone/floatstone – biolithite/ biomicrudite with abundant, coarse-grained, poorly sorted rudist fragments in dark, organic-rich matrix (floatstone/biomicrudite) or large rudists in life-growing position (boundstone/biolithite).

Properties:
Stone is suitable for interior decoration. Exterior application leads to discoloration of dark matrix due to oxidation of organic component.

Monuments:
- Wall decoration in NAMA department store, Zagreb
- decoration of exterior and interior of Vatroslav Lisinski Concert Hall in Zagreb

Interesting facts:
The stone is very decorative due to "dynamic" in various sizes and corosscuts of rudist (usually light coloured) and dark matrix rich in organic component.

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