CASE STUDY

Use of Poultices to repair engorged stones at the Montreal Masonic Temple

LEARNING OBJECTIVES

- How stones get saturated or engorged with humidity
- What a poultice is
- How poultices work
- When to use a poultice
- How to select an effective poultice for a particular stone
- How we used the poultice in the case of the Masonic Temple

LE MASONIC TEMPLE 2003

HOW DO STONES GET ENGORGED

- How does water enter a material?
  - Source of moisture
  - Opening or porosity
  - Force to drive the water into the material
- The Forces that can drive moisture into stone are:
  - Gravity
  - Surface tension/capilarity
  - Difference in pressure and/or temperature on either side o the stone
  - Uncontrolled Power Washing

THE ENGORGED STONES OF THE MASONIC TEMPLE

- Left side of Sherbrooke facade was cleaned by water run-off. We caught a worker power washing the wall, we stopped them and at the left side of the building no stones are engorged.
- The stones were not engorged they eventually dried out before the month of November.

THE WET PATCHES ON THE WALL

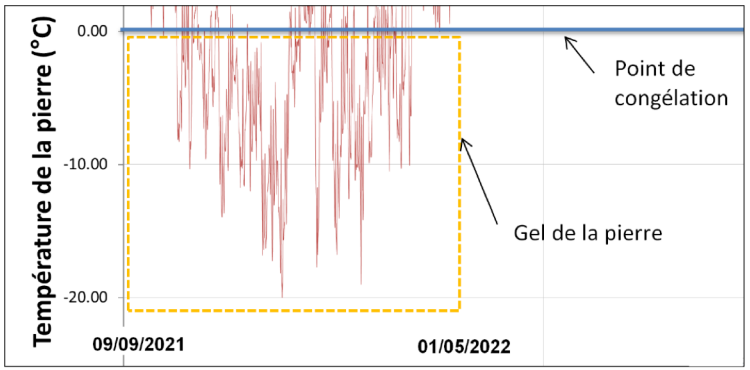
- Right side of the building was completed in record time the week the architect went on vacation in July.
- The wall still had the patches of wetness on November 20th.
- At 75 freeze thaw cycles the stones will show signs of deterioration due to the expansion and contraction of the moisture in the pores of the stones.

REMOVING MOISTURE FROM STONES

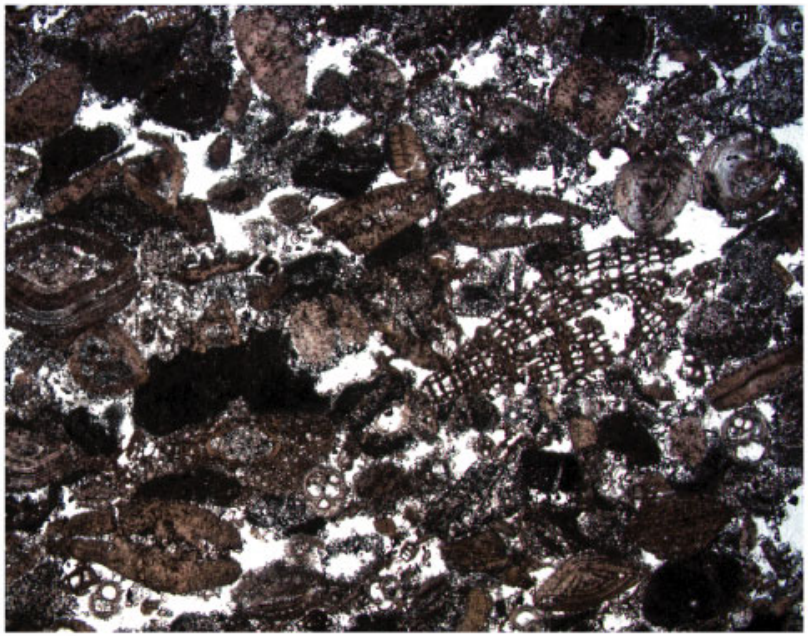
By microabrasion -failed

By heating - failed

Number of Freeze Thaws anticipated in December

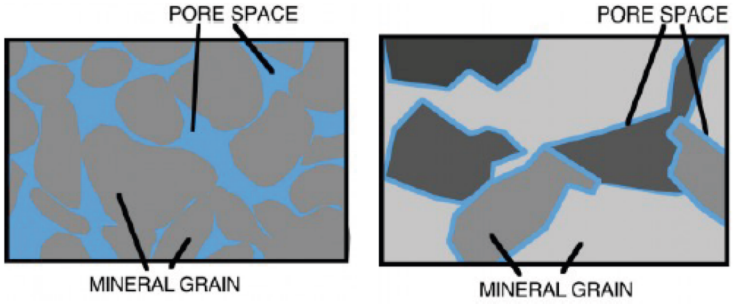


THE POROSITY OF STONES



500 µm

Visualizing pore space (pores shown in blue)



Porosity measurements of Wisconsin rocks

The **porosities** of the rocks measured vary from 2% to more than 30%. Much of this variation is due to lithology (rock type). The data table lists the porosities of the tested samples and the figure at right shows the range and distribution of porosities by lithology. The dolomites have the lowest porosities (2–6%), the shales have the widest range of porosities (8–29%, although most are less than 15%), and the sandstones have the highest porosity (11–32%).

QUEENSTON LIMESTONE OR DOLOMITE

Dolomite: A Mineral and a Rock

"Dolomite" is a word that is used by geologists in two different ways: 1) as the name of the mineral dolomite; and, 2) as the name of a rock known as dolomite, dolostone or dolomite rock.

This page is about dolomite rock. If you are looking for an article about the mineral, please go **here**.

What is Dolomite?

Dolomite, also known as "dolostone" and "dolomite rock," is a sedimentary rock composed primarily of the mineral dolomite, $CaMg(CO_3)_2$. Dolomite is found in sedimentary basins worldwide. It is thought to form by the postdepositional alteration of lime mud and limestone by magnesium-rich groundwater.

Dolomite and limestone are very similar rocks. They share the same color ranges of white-to-gray and white-to-light brown (although other colors such as red, green and black are possible). They are approximately the same hardness and they are both soluble in dilute hydrochloric acid. They are both crushed and cut for use as construction materials and used for their ability to neutralize acids.

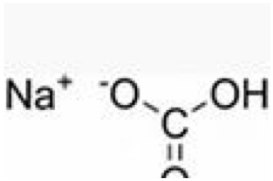
Stone from Queenston Quarry was once one of the most important and widely used types of stone in all of Canada

REMOVAL OF MOISTURE BY CAPILARY ACTION = POULTICE

POULTICE OF SODIUM BICARBONATE

Sodium bicarbonate

Chemical Compound



Sodium bicarbonate is a chemical compound with the formula $NaHCO_3$. It is a salt composed of sodium ions and bicarbonate ions. Sodium bicarbonate is a whit… +

Wikipedia

Density: 2.20 g/cm³ (1.27 oz/in³)

Boiling point: 851 °C

Melting point: 50 °C

Average Molar mass: 84.01 g/mol

THE PROCESS

THE PROCESS

THE RESULT

RESULTS
CLEANING WITH WATER RUN-OFF

RESULTS
CLEANING WITH WATER RUN-OFF

THE END

Thank you!