

Geology

The following information is provided by the Kentucky Geological Survey and amended by KATP for this publication.



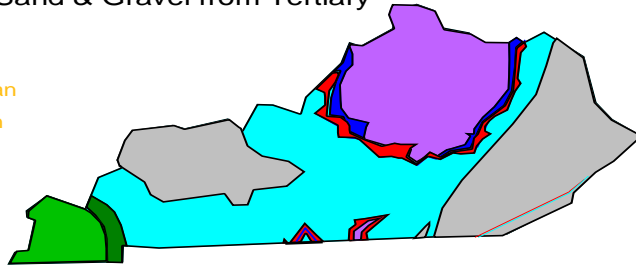
Quarry Logs



Geologic Map of Kentucky

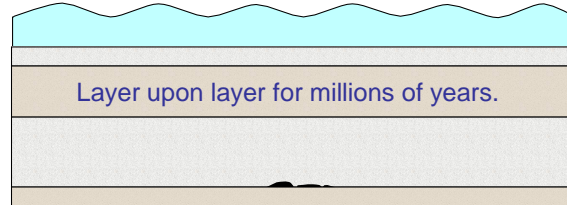
- The colors on the map represent different units and ages of rocks.
- Because the types of rocks change across the State, mineral resources derived from those rocks also change.
 - Coal from Pennsylvanian
 - Limestone from Silurian and Ordovician
 - Sand & Gravel from Tertiary

- Tertiary
- Cretaceous
- Pennsylvanian
- Mississippian
- Devonian
- Silurian
- Ordovician



How did our crushed stone resources form?

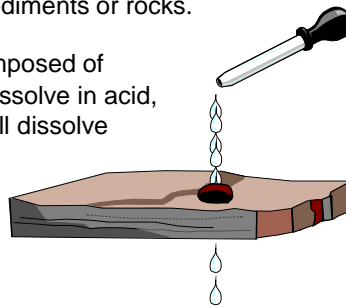
- Crushed stone is made from limestone and dolomite.
- Gravel can also be crushed for aggregate applications.



Limestone and dolomite (dolostone) are formed from the deposition of carbonate mud, silt, and sand in ancient oceans. Sand & gravel are deposited by ancient and modern rivers and streams.

Carbonate Rocks

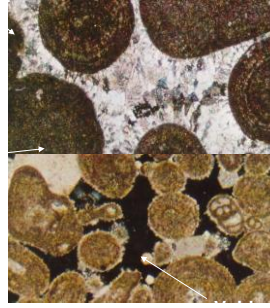
- Limestone is a calcium carbonate (CaCO_3).
- Dolomite is a magnesium calcium carbonate (MgCaCO_3). It forms when magnesium-rich fluids pass through carbonate sediments or rocks.
- Because both are composed of carbonate, they will dissolve in acid, although limestone will dissolve faster than dolostone.



The hardness of carbonate rocks varies

Limestone under the microscope

- When the grains within a carbonate rock are well cemented the rock is hard.
- When the grains within a carbonate rock are poorly cemented the rock is soft.



(Photographs from Scholle, 1978, p.163)

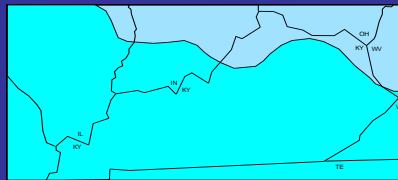
The amount of cementation can vary vertically between rock layers as well as laterally within the same layer.

Scholle, P.A., 1978, A color illustrated guide to carbonate rock constituents, textures, cements, and porosities: AAPG Memoir 27, 241 p.

The soundness of carbonate rocks varies

- The amount of clay and quartz grains within limestones affects the soundness of the rock.

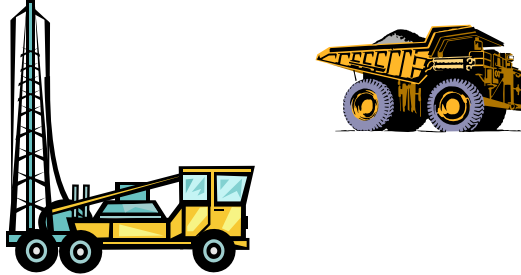
- Clear seas
- Muddy seas
- Deltas
- Rivers



- During deposition, limestones were deposited in seas.
- Deltas sometimes advanced into the seas, introducing clays and other detrital sediment into the lime muds, to form argillaceous, or shaly limestones.

QUARRY LOGS

Prepared by KYTC for quarries and mines



Quarry Log Information

- Source ID, Location, Inspector, Date Reported
- Physical & Chemical Test Results, Ledges & Benches, Geologic Description
- Remarks, Profile of Ledges & Benches, Restrictions

KENTUCKY TRANSPORTATION CABINET
 DIVISION OF MATERIALS
 QUARRY REPORT

SOURCE NO.: P031201		PRODUCER: BEDROCK CRUSHED STONE					TYPE OF OPERATION: QUARRY								
GEOLOGIC AGE / FORMATION: MISSISSIPPIAN / PETOSKEY LIMESTONE & MORRISON FORMATION															
COUNTY: MARION, IN				LOCATION: LOUISVILLE, KY, NORTH ON I-65, WEST ON ST. RT. 25, LEFT ON QUARRY ROAD											
LAST INSPECTED BY: TIM PORRITT										DATE REPORTED: 8-23-05					
PHYSICAL TEST						CHEMICAL ANALYSIS					LEDGE / BENCH	DESCRIPTION			
ID & DATE	SP. GR.	SOUND	LA	Ca	Mg	Si	R ₂	CO ₂	CO ₃	O ₂	O ₃	IR	THICK	DESCRIPTION	
SIZE	SAMPLED	ABS.	(SSD)	NESS	WEAR	PI	CO ₃	CO ₃	O ₂	O ₃	IR	NO.	NESS	OF LEDGES OR BENCH	
													19'	Soil - STRIPPING	
													15'	Light gray-gray, thin-thick bedded, med-coarse grained, limestone with occasional fossils, stylolites and ironstone nodules. Unsampled.	
													2'	Greenish-gray, soft, fissile shale-WASTE BENCH	
57	00096 4/8/04 L1-2	1.4	2.66	9	25	18						1	15.5'	A Light gray, fine grained, thin to medium bedded, finely oolitic, crystalline limestone.	
8	00097 4/8/04 L1-2	1.5	2.67	8	26		55	38	6	1	1	2	11.5'	A Light gray-brown, thin-med bedded, fine grained, stylolitic limestone with occasional thin 1"-2" shale partings. Sparsely fossiliferous & finely oolitic.	
														BENCH	
													3	4.5'	B Light gray, fine grained, thick bedded, crystalline limestone with sparse thin (1/4") shale partings. No fossils or large crystals.
													4	1.5'	B Light gray, fine grained, thick bedded, crystalline limestone. Same as Ledge 3.
													5	3'	B Light tan, thick bedded, fine grained, relatively soft limestone with no fossils or visible crystals.
														BENCH	
57	00453 8/22/05 L6-9	1.5	2.75	10	28	36							6	8'	C Light gray-light brown, very fine grained (micrite), med-thick bedded, limestone with conchoidal fracture, very smooth texture & occasional larger crystal grains.
8	00452 8/22/05 L6-9	1.6	2.73	8	28		56	32	9	3	2		7	6.5'	C Light gray-white, med-thick bedded, oolitic limestone. Ooliths very obvious but small. No fossils.

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ID & DATE	SP. GR.	SOUND	LA	PI	Ca	Mg	Si	R ₂	O ₃	IR	NO.		THICKNESS
SIZE SAMPLED	ABS.	(SSD)	NESS	WEAR	CO ₃	CO ₃	O ₂	O ₃	O ₃	IR	NO.	THICKNESS	
00451 LSS 8/22/05 L6-9	1.8	2.72	11.0								8	13'	C
											9	11.5'	C
<p>CHEMICAL ANALYSIS (Performed on 8's) CaCO₃ - Calcium Carbonate MgCO₃ - Magnesium Carbonate R₂O₃ - Trace Metals SiO₂ - Silica IR - Insoluble Residue PI - Pore Index</p> <p>SUPT.: JOHN GRAVELY TECH.: FRED FLINTSTONE</p>					<p>REMARKS:</p> <ol style="list-style-type: none"> Acceptance samples for aggregate supplied to the Transportation Cabinet will be taken at the last practical sampling point. Aggregate produced for the Transportation Cabinet must be from a bench that has been tested for quality. The finished product must meet all applicable specification requirements. At this time only Benches A and C have been tested and are approved for state use. The Division of Materials must be notified when changes are made in bench elevations. Ledges approved for concrete uses requiring freeze/thaw specifications currently include size 57's or smaller from Bench A, Ledges 1-2, only. Aggregate from Bench B has not been tested and is not approved for supply to Kentucky projects. Bench C Ledges 6-9 are currently in testing for Freeze-Thaw specifications. 								
PLEASE KEEP THIS QUARRY REPORT AT THE QUARRY						RESPECTFULLY SUBMITTED							
<p>BLUE - Indicates most recent test results for each bench. RED - Indicates restricted bench, waste and/or poor quality ledge.</p>													
COPIES TO: CO-DME-AGG SECT.-SMITH						DIRECTOR OF MATERIALS							

