

# OFFICE MEMORANDUM



MICHIGAN

DEPARTMENT OF STATE HIGHWAYS

April 26, 1977

To: L. T. Oehler  
Engineer of Research

From: R. W. Muethel

Subject: Petrographic Analysis of Coarse Aggregate: Glancy Pit No. 6-23,  
(Research Laboratory Sample No. 77 A-1), Research Report No.  
R-1060.

On January 6, 1977 a sample of crushed stone coarse aggregate was received by the Research Laboratory. Information accompanying the sample stated that the material was obtained by L. Dunn from the Glancy quarry Pit No. 6-23, location south 1/2 of southeast 1/4, Section 14, T20N-R7E, Arenac County. The material was reportedly produced from the full 12-ft quarry face. The sample identification states that the material was produced for use in bituminous pavement mixtures.

The material was submitted to the Laboratory for petrographic analysis and wear track polishing tests requested by G. H. Gallup.

## Summary

Rock Class	Condition of Particles	Percent of Sample
Sedimentary	Hard to soft, fresh, and non-porous to slightly porous	100

The sample was found to contain traces of soil material, primarily adhering to rock particles. The material was found to be readily removed during gradation and washing of the samples.

Detailed tabulations of petrographic composition are included in Table 1.

## Detailed Petrography

Petrographic examination was conducted in general conformance with ASTM C295, "Petrographic Examination of Aggregates for Concrete." Represent-

sentative portions -- 300 particles -- of each sieve fraction of the sample were identified megascopically, along with acid testing and a scratch test for hardness, and microscopically with a stereomicroscope. The following pages contain the rock type descriptions.

TESTING AND RESEARCH DIVISION



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Geologist - Materials Research Unit

RWM:bf

TABLE 1  
 PETROGRAPHIC COMPOSITION  
 COARSE AGGREGATE  
 Research Sample No. 77 A-1

Rock Type	Sieve Fraction Analyzed			Computed Sample Composition
	3/4 to 1/2-in.	1/2 to 3/8-in.	3/8 to No. 4	
Limestone	39.0	40.0	49.3	42.8
Arenaceous Limestone and Calcareous Sandstone	52.3	46.0	42.7	47.0
Shaley Particles	5.0	10.0	4.7	6.5
Chert	3.7	4.0	3.3	3.7
Totals, percent	100.0	100.0	100.0	100.0

NOTE: Computed sample composition is based upon counts of 300 particles contained in each of the sieve fractions noted.

SEDIMENTARY ROCKS

Rock Type	Limestone	Arenaceous Limestone and Calcareous Sandstone	Shaley Particles
Color	buff to brown, gray; and mottled buff and brown	buff, gray; and mottled buff and gray to dark brown	mottled buff to gray and dark brown to black
Texture	very fine grained to micro-crystalline	fine grained to micro-crystalline	fine grained to micro-crystalline
Luster	dull	dull	dull
Hardness	moderately hard to soft: Mohs 3 to 2-1/2	matrix moderately hard: Mohs 3; quartz grains hard: Mohs 7	hard to soft: Mohs 7 to 2-1/2
Porosity	non-porous to slightly porous	non-porous to slightly porous	non-porous to porous
Particle Shape	angular	angular	angular
Particle Surface	fresh, rough to smooth, dented to ridged	fresh, rough, dented to ridged	fresh, rough, dented to ridged
Remarks	Some particles contain small irregular shaley to argillaceous zones. A few particles contain traces of quartz grains or pyrite.	Particles contain variable content of subangular to rounded, frosted to smooth quartz grains predominantly finer than No. 50 and coarser than No. 200. Some particles contain traces of shaley material.	Particles included in this category are predominantly inter-bedded calcareous sandstone and black shale. A few particles of highly laminated limestone are included in this category

SEDIMENTARY ROCKS (Cont.)

Rock Type	Chert	Soil Material
Color	buff; and mottled buff and gray	mottled reddish brown to brown, and buff
Texture	microcrystalline	very fine grained to microcrystalline
Luster	dull to subvitreous	earthy
Hardness	hard: Mohs 7	soft
Porosity	non-porous to slightly porous	porous
Particle Shape	angular to conchoidal	massive
Particle Surface	fresh, rough, dented to ridged	fresh, rough
Remarks	Particles are predominantly fragments of spherical chert concretions.	Material decomposes to sand, silt, and clay when immersed in water. Soil material is present in the sample as small lumps, primarily adhering to some of the rock particles. The material is readily dislodged by screening and washing.