

## OFFICE MEMORANDUM

MICHIGAN

STATE HIGHWAY DEPARTMENT



May 13, 1965

To: W. W. McLaughlin  
Testing & Research Engineer

From: E. A. Finney

Subject: Performance of Aggregate from the Clarence Sweet Pit (No. 3-65) in  
I 196 Pavement North of South Haven. Research Project 64 A-23.  
Research Report No. R-513.

This cooperative project between the Testing Laboratory and Research Laboratory Divisions was outlined in a meeting on February 14, 1964. M. G. Brown's memorandum to me dated February 26, summarized the meeting and planned work on the project was distributed to interested personnel. This was in accordance with a decision at a Testing and Research staff meeting of January 13, 1964.

L. F. Holbrook developed a statistical sampling procedure for conducting the field surveys, which was used in determining the performance of the aggregate from this pit as summarized in Table 1. Fig. 1 shows the composition of the aggregate causing popouts, in terms of weighted average for all construction projects involved. This memorandum completes the Research Laboratory's assignment on this project, which was to conduct the field survey and analyze the popout data.

The data indicate that chert caused about three times as many popouts as "other" types. The "other" types of gravel causing popouts were primarily several forms of "siderite" or iron bearing clay as found in varying amounts in Sweet Pit gravel. All projects listed in Table 1 were paved in 1963, using Sweet Pit 6A (3-65) with 4A limestone from the Presque Isle quarry (71-47), with one exception as noted in the table.

The Research Laboratory intends to follow the same statistical sampling procedure in conducting popout surveys on limestone aggregate from the Waterville, Ohio quarry of the France Stone Co. under Research Project 62 A-22.

OFFICE OF TESTING AND RESEARCH

E. A. Finney, Director  
Research Laboratory Division

EAF:nl

cc: C. J. Olsen  
G. H. Gallup  
O. L. Lindy  
M. G. Brown

TABLE 1  
 PERFORMANCE OF AGGREGATE  
 FROM CLARENCE SWEET PIT (3-65) IN I 196 CONCRETE PAVEMENT PROJECTS

Project and Length	Stone Type	Percent of Popouts of Size Shown				Avg. Popouts per 100 ft of Traffic and Passing Lanes
		1/2 to 1-1/4 in.	1-1/4 to 2 in.	2 to 3 in.	3 to 4 in. Over 4 in.	
80013, C1 03033, C10 (5.6 mi.)*	Chert	61.0	14.0	2.5	-	100.0
	Other	16.5	3.5	2.5	-	
03033, C14 (4.3 mi.)	Chert	70.1	9.6	1.3	-	128.8
	Other	16.8	1.4	0.6	0.1	
03033, C16 (3.2 mi.)	Chert	62.9	5.3	0.5	-	102.6
	Other	28.0	2.5	0.6	0.2	
03033, C12 03034, C7 (6.6 mi.)	Chert	63.7	8.6	0.5	0.1	88.8
	Other	23.0	3.1	0.8	0.2	

\* Part of northbound and all of southbound roadway constructed in 1962 with 6A coarse aggregate from Ferrysburg Pit (70-9). Rest of this project and all other projects built in 1963 with 6A from Sweet Pit (3-65) and 4A from Presque Isle quarry (71-47).

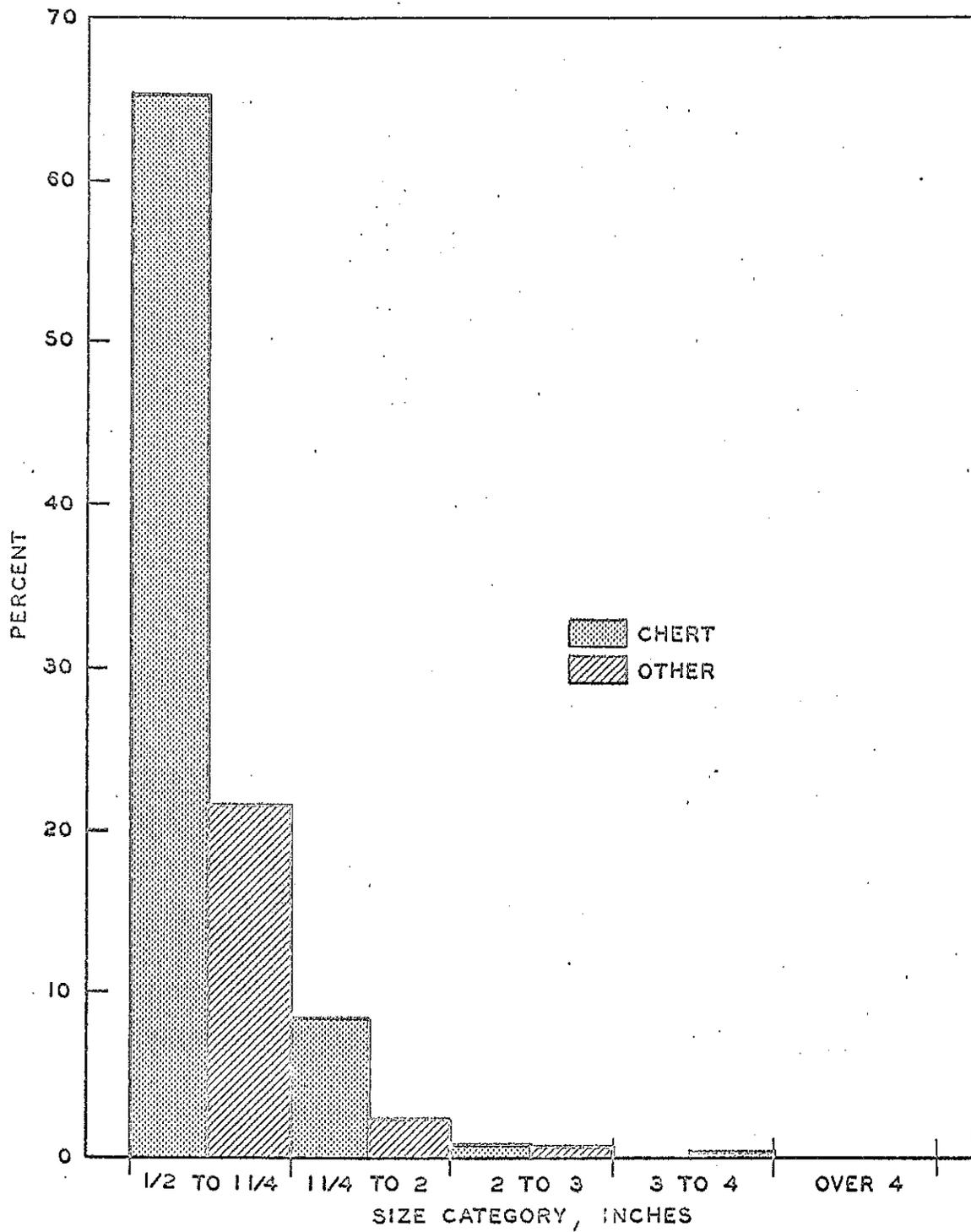


Figure 1. Composition of coarse aggregate causing various sized popouts - weighted average for all projects.