MICHIGAN
STATE HIGHWAY DEPARTMENT
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State Highway Commissioner

REPORT ON EXPERIMENT WITH HP 7 ADMIXTURE
US 23A - Rogers City - F 71-24,C1

Research Project 42 B-15(1)
Progress Report

Research Laboratory
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EXPERIMENT WITH HP 7 ADMIXTURE
US 23A - Rogers City - F 71-24,C1

(Highway Research Report 3107 - W.C. Broughton)

In 1942 Project 71-24,C1 located on US 23A in Rogers City was established as an experimental concrete pavement project containing HP 7, a powdered chemical compound manufactured by the Master Builders Co. of Cleveland, Ohio. This project was constructed using both fine and coarse limestone aggregates from the Rogers City Quarry and the HP 7 was added as an admixture to prevent bleeding and subsequent scaling.

The experiment was conducted under the supervision of the Construction Division with Roy Fulton assigned to the project to observe the work. Mr. Roy Fulton has submitted two reports. The first, not dated, covers rather completely all history and construction details. A more recent report by Mr. Fulton dated April 10, 1952 discloses scaling on the control section between stations 30/50 and 36/20 in which HP 7 was omitted.

At the request of Mr. W. W. McLaughlin condition surveys have been made by Messrs. W. C. Broughton and E. A. Finney covering a period between October 1952 and August 1953.

In October 1952 a complete condition survey and skidding tests were made under the supervision of W. C. Broughton. The only scaling to have developed on this project at that time was in the west 600 foot section which contains none of the admixture HP 7. The general condition of the pavement at that time is illustrated in Figure 1.

Skidding tests were made on October 28, 1952 with the following results:

	LENGTH OF SKIDDING IN FEET							
Sta.	1	2	3	4	5	6	Ave.	Factor
44/00	45	44	39	32	29	26	35.83	0.372
21/00	40	32	31	32	36	35	34.33	0.388
							Av.	0.38

The average skidding factor was 0.38 which is under the minimum value of 0.40 recommended by AASHO for concrete pavements.

In March 1953 four cores were taken from the project to check air content and strength of the concrete. Cores were taken from both the treated and untreated concrete pavement. Results are given below:

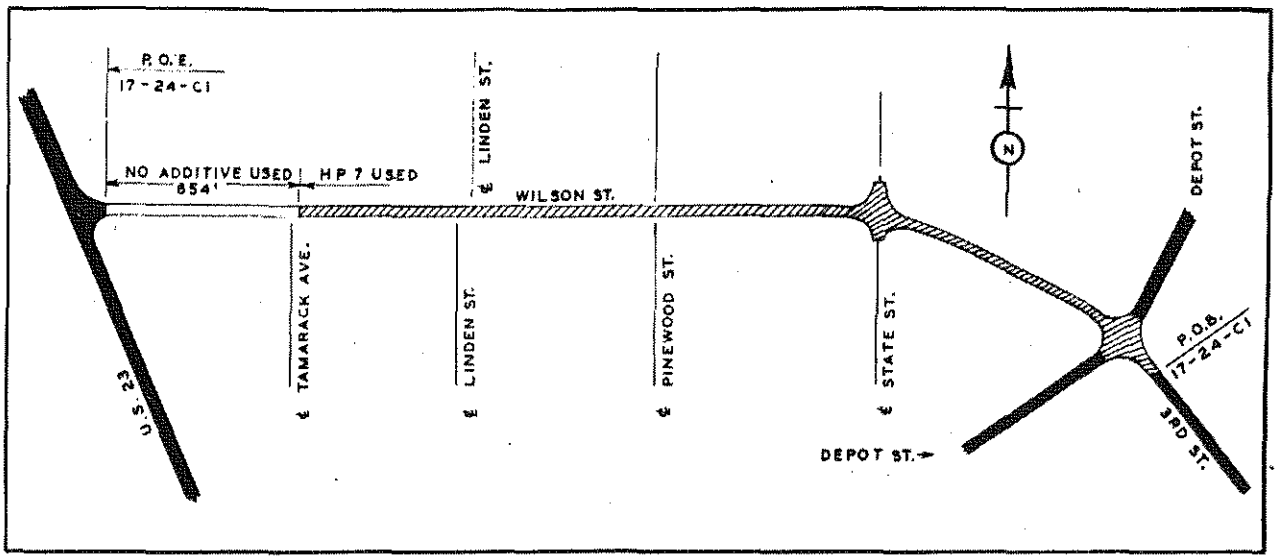
CORE	ADMIXTURE	% AIR	COMPRESSIVE STRENGTH, psi	
161	HP 7	5.29	5,270)	4410
162	HP 7	6.52	3,570)	
163	Standard	1.55	5,580)	5035
164	Standard	2.87	4,490)	

Core sections from which air content determinations were made are shown in Figures 2, 3, 4, and 5. Core sections in Figure 2 and 3 contain HP 7. Note size and distribution of air bubbles. Figure 4 and 5 show standard concrete without HP 7. In this case the air bubbles are few but large and widely dispersed.

On August 9, 1953 pictures were taken of scaled areas by E. A. Finney. These are shown in Figure 6, 7, 8 and 9. Scaling and subsequent deep pitting has become extensive over the west end of this project, where HP 7 was not used. The condition of the pavement surface is such that only a regular hot mix asphalt concrete resurfacing course will suffice to do a satisfactory repair job. This work should be done immediately between Sta. 30+20 and 37+00.

The balance of the project is in excellent physical condition. As shown in Figure 1, no scaling has taken place on the HP 7 section and in only a very few instances has cracking been observed.

The project as a whole has the slippery when wet characteristics of stone sand concrete as experienced on concrete pavements built with Inland Stone Sand. However the State Police report that for at least the past three years there have been no skidding accidents on this project involving wet pavement. The location of the project is in a low speed area which may account for this fact.



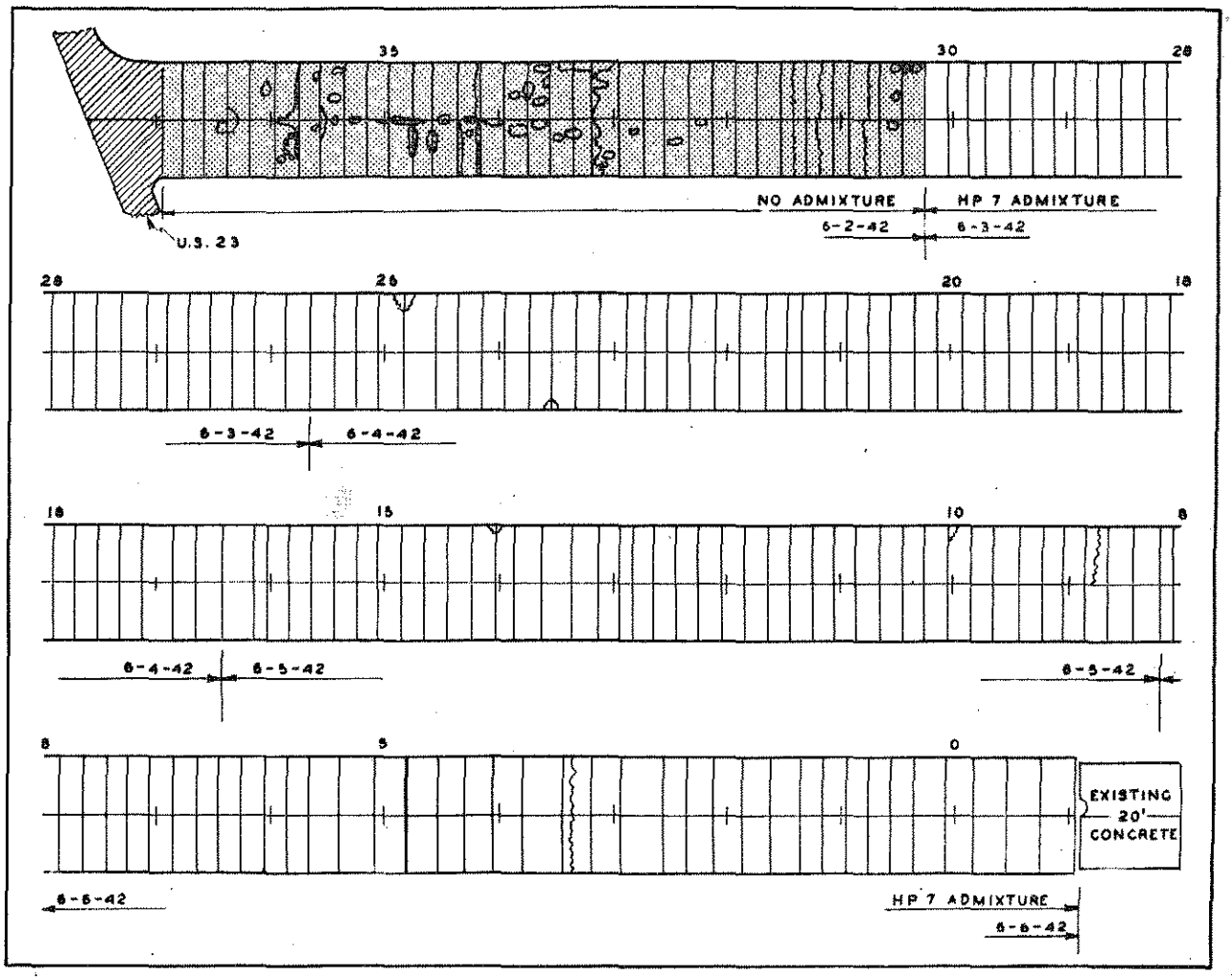
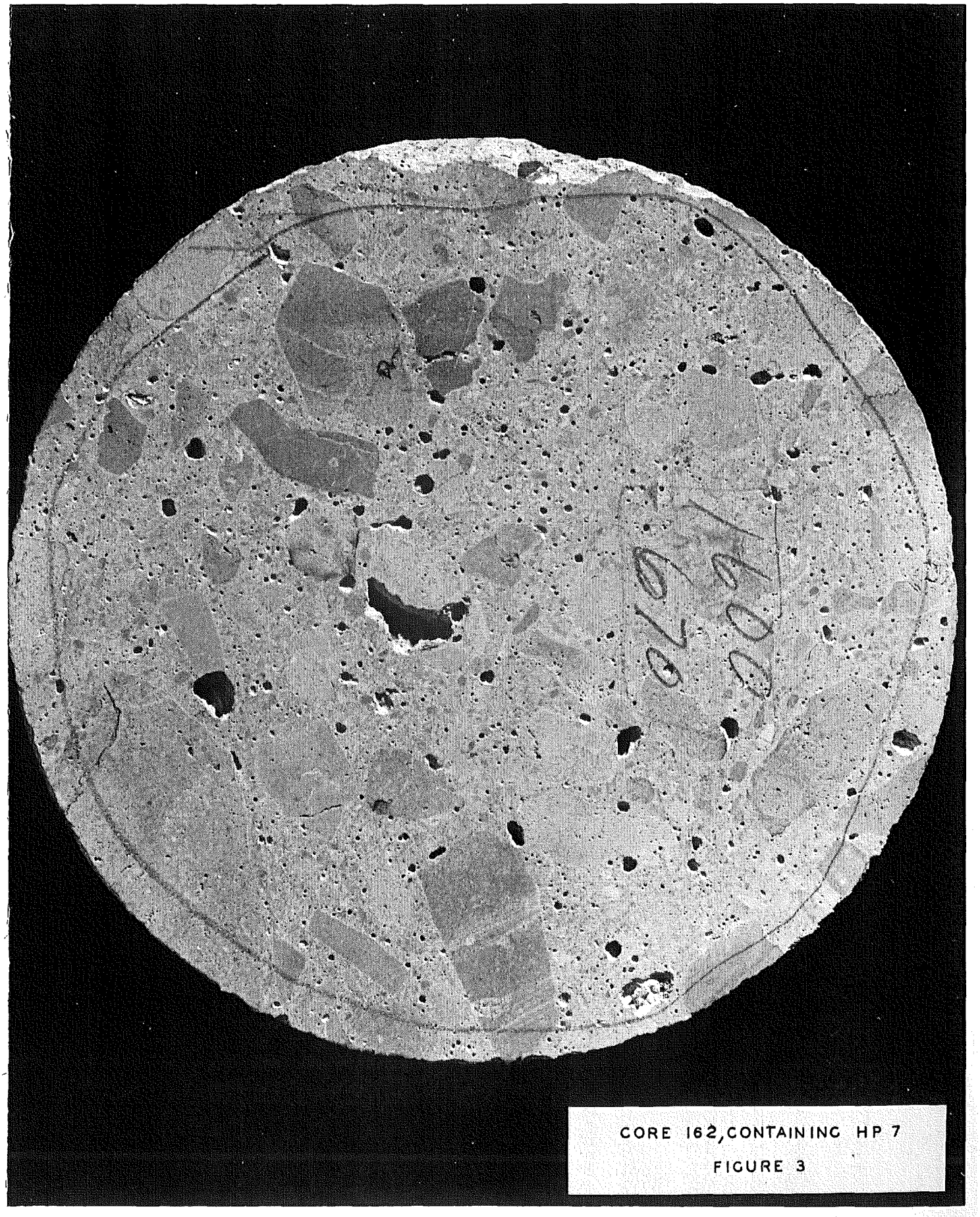


FIGURE 1

LOCATION AND CONDITION SURVEY DATA
HP 7 EXPERIMENTAL PROJECT, ROGERS CITY
CONSTRUCTION PROJECT 71-24, C1

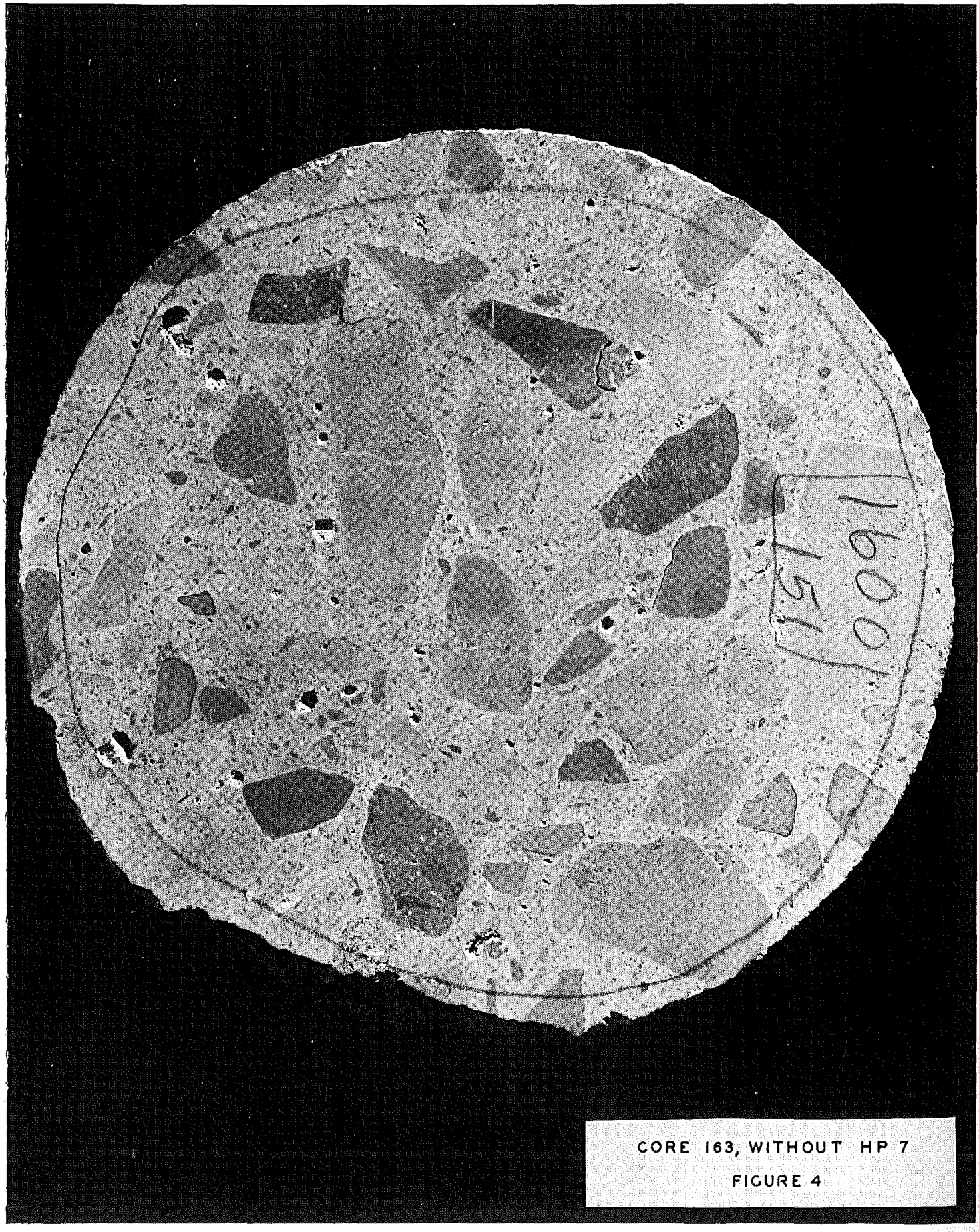
CORE 161 CONTAINING HP 7

FIGURE 2



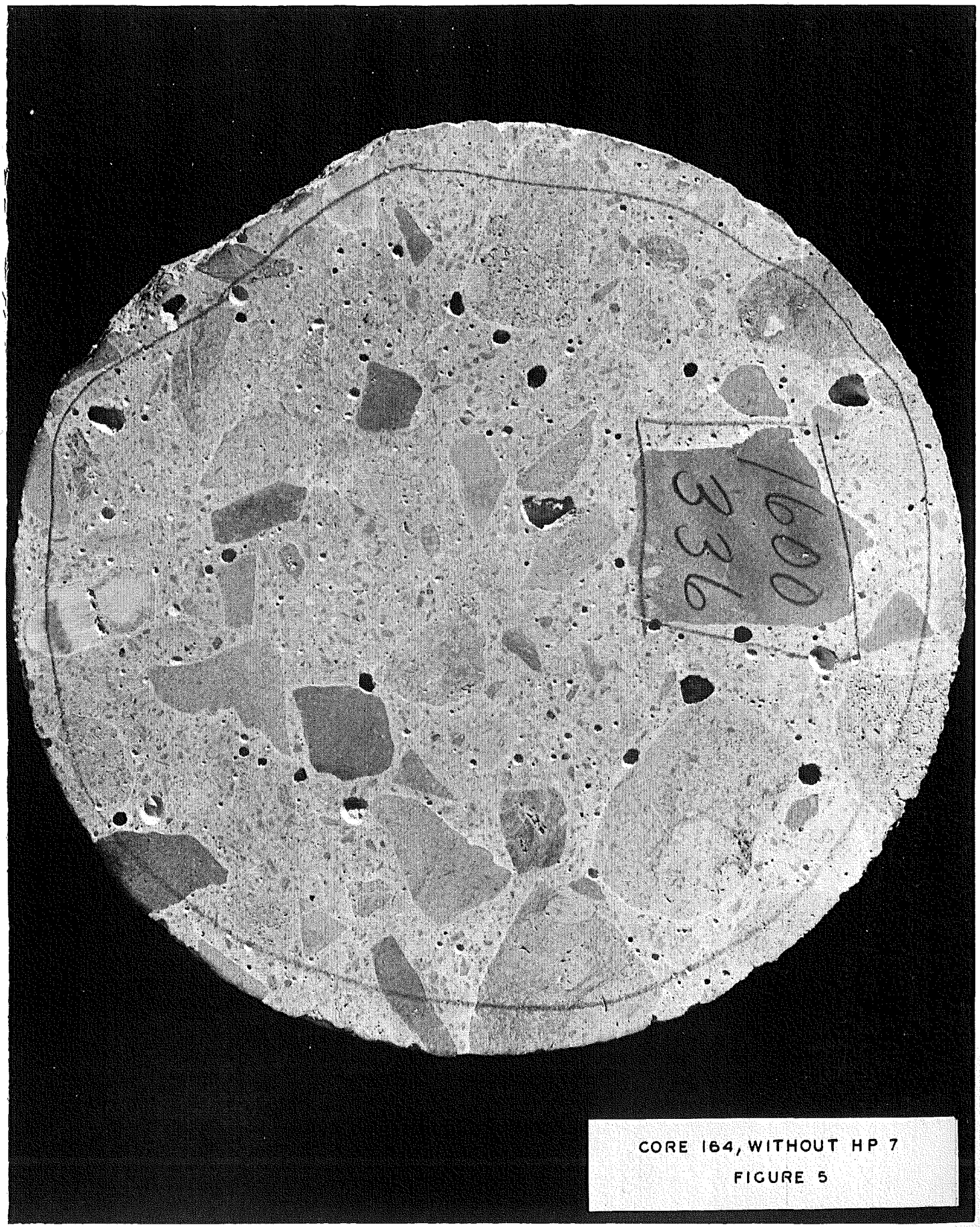
CORE 162, CONTAINING HP 7

FIGURE 3



CORE 163, WITHOUT HP 7

FIGURE 4



CORE 164, WITHOUT HP 7

FIGURE 5

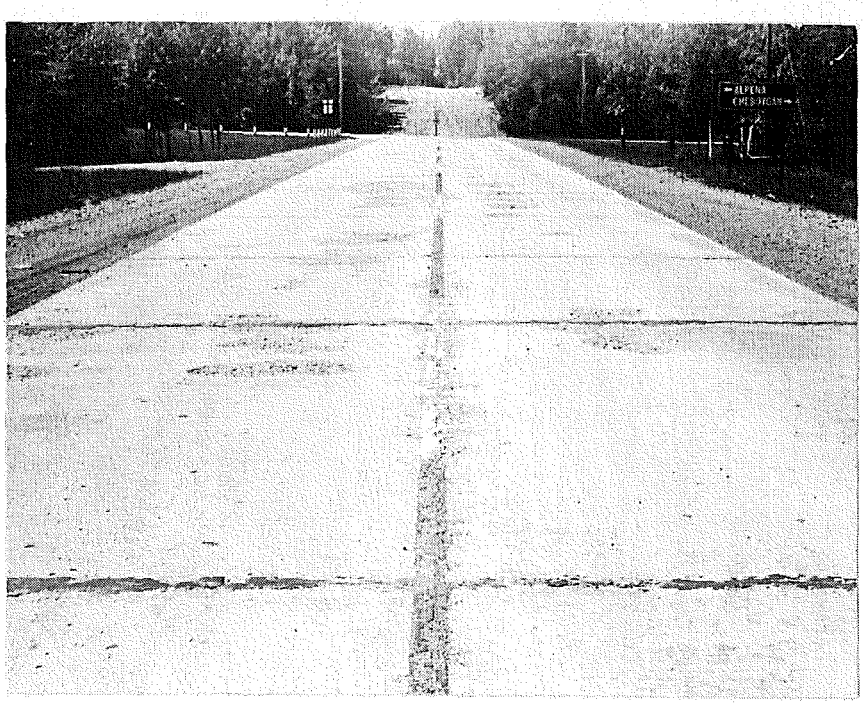


Fig. 6. F 71-24,C1 - Typical scaling at west end of project between Stations 30+20 and 37+00 where HP 7 was omitted.

Fig. 7. Character of scaling and deep pitting 33+00

Fig. 8. Typical scaling and pitting at Sta. 34+00.

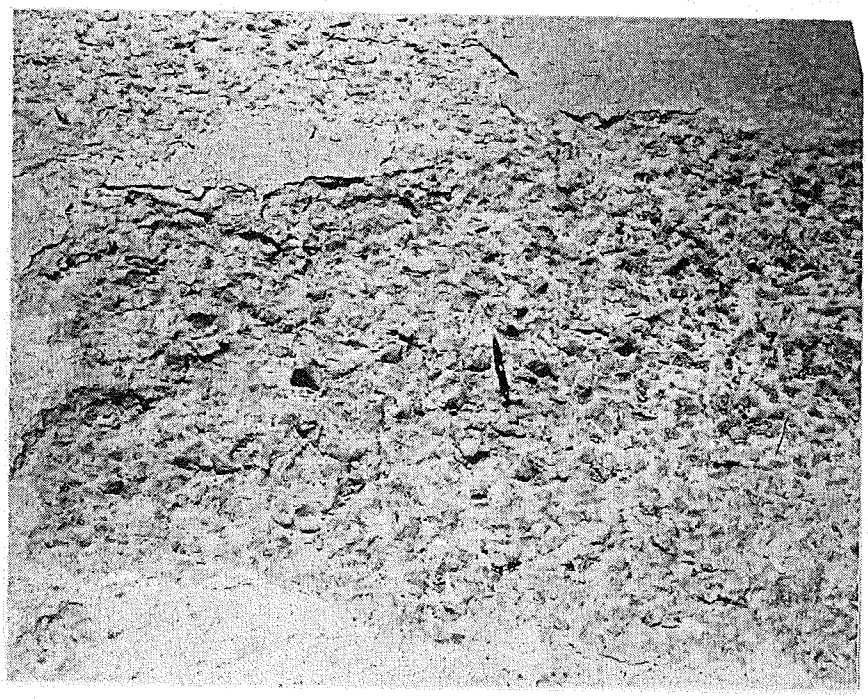


Fig. 9. Close view showing depth of spalling. 34+00.