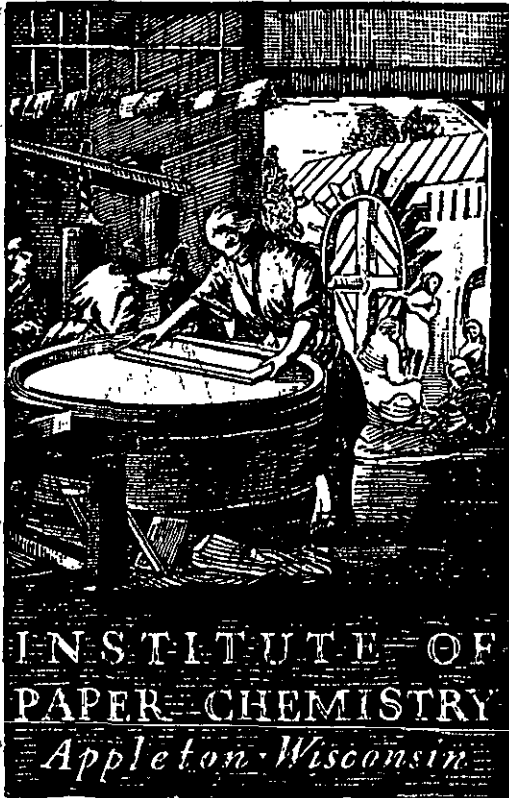


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**CONTINUOUS EVALUATION OF  
CORRUGATING MEDIUM**

Project 1108-17

Progress Report Twenty-four

to

**FOURDRINIER KRAFT BOARD INSTITUTE, INC.**

November 1, 1957

THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

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## CONTINUOUS EVALUATION OF CORRUGATING MEDIUM

The purpose of this study is to provide a continuous evaluation of the quality and runability of corrugating medium produced by members of the Fourdrinier Kraft Board Institute. The study, as it progresses, will accumulate a backlog of data and experience which will provide two important benefits. First, it will enable each participant to evaluate his position in relation to the rest of the industry. Second, it will provide information essential for the interpretation of any proposed specifications on corrugating medium (on either a company or industry basis).

The procedure for participating in this study involves the submission of two rolls of corrugating medium per week from each machine to The Institute of Paper Chemistry. These rolls are taken from regular production runs on different days. Each roll is 10 to 12 inches wide and contains approximately 2,500 lineal feet of medium (approximately 20 inches in diameter). Each roll as it is received by the Institute is assigned a code letter and number. The rolls are numbered in the sequence in which they are received. Code letters are assigned on the basis of machines and a given machine is assigned a different code letter each month in order to mask the identity of the mills. For purposes of reference, a copy of the outline of the program together with the necessary instructions for sampling was appended to Progress Report One in this series.

During the month of October, sixty-one different sample lots of corrugating medium, submitted from the production of fifteen machines, were evaluated at The Institute of Paper Chemistry. A tabulation of the samples classified according to machines may be seen in Table I.

TABLE I  
DISTRIBUTION OF CORRUGATING MEDIUM SAMPLES

Machine Code	Number of Samples
A	1
B	1
C	4
D	0
E	2
F	9
G	2
H	1
I	3
J	7
K	12
L	2
M	0
N	0
O	2
P	0
Q	7
R	6
S	<u>2</u>
Total	61

Each sample of corrugating medium was evaluated for basis weight, caliper, Concora flat crush, H. and D flat crush (single-faced board), and runability. Runability was measured by corrugating each roll under standardized conditions on the Institute's corrugator into A-flute board at 600 feet per minute with minimum tension. If unsatisfactory

runability occurred at this speed, the corrugator was slowed down in increments of 25 f.p.m. until satisfactory runability was obtained (no ruptured flutes). If the medium fabricated satisfactorily at 600 f.p.m. with minimum tension, further runs were made at higher tensions to determine when cracking occurred. The higher tensions used were 0.5 lb. per inch, 1.0 lb. per inch, and 1.5 lb. per inch.

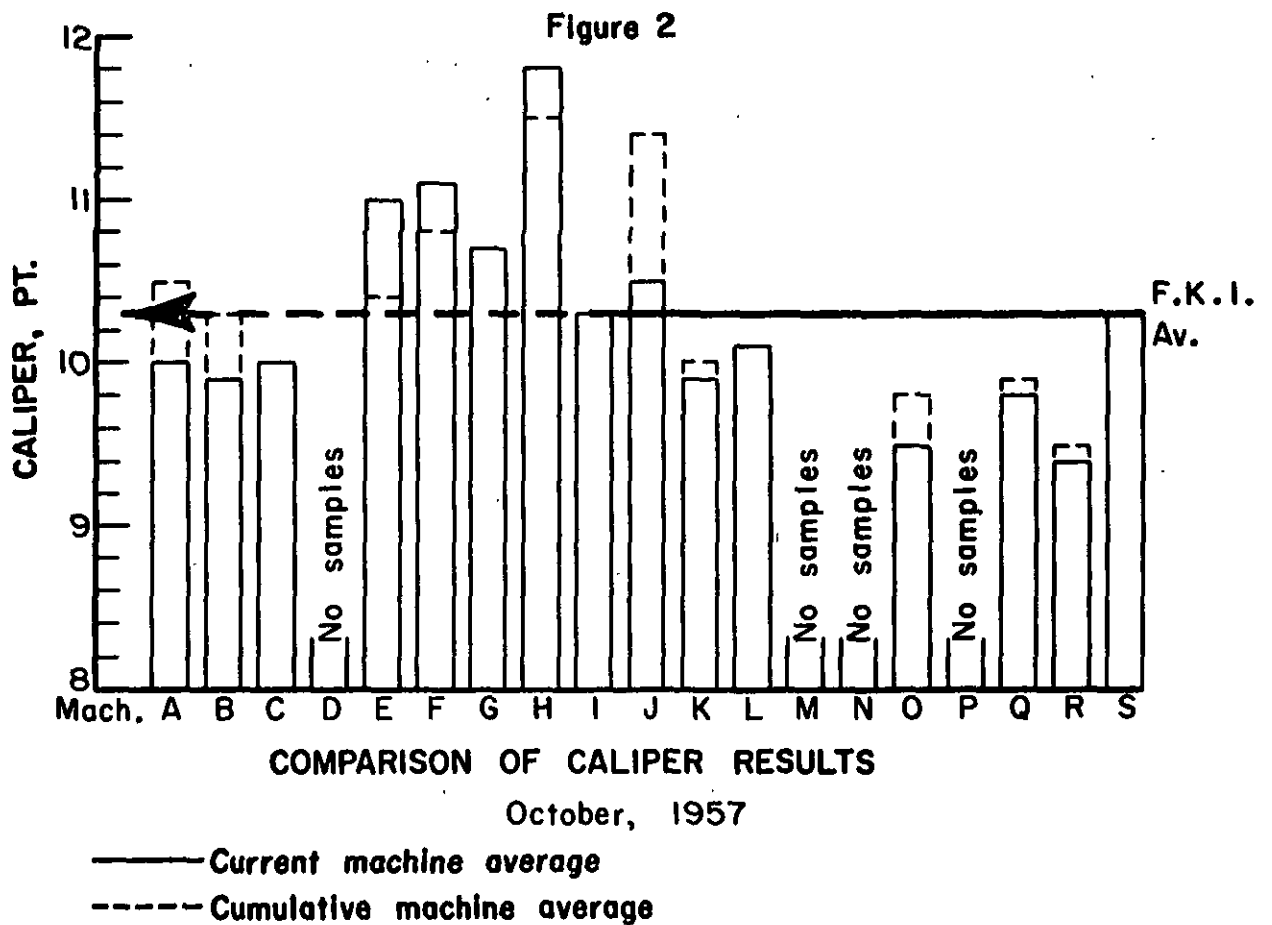
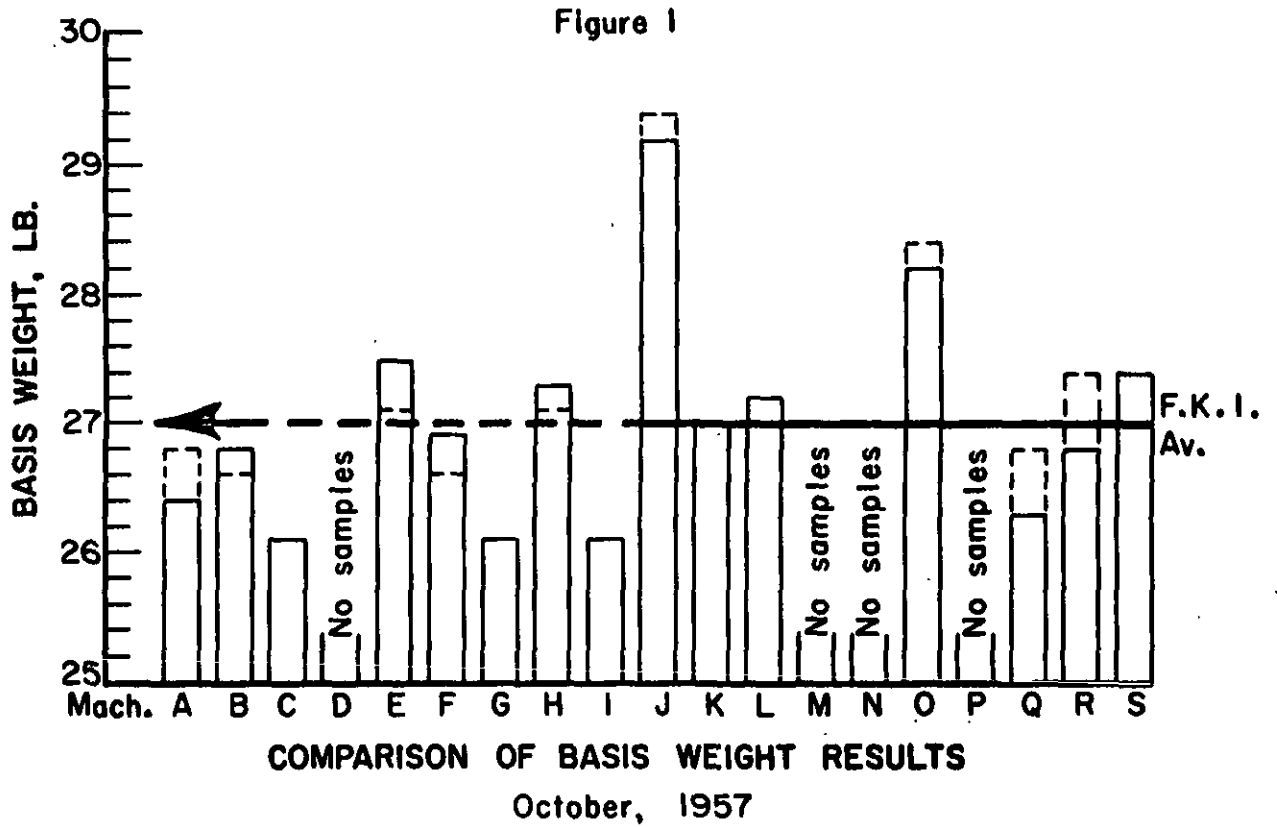
Flat crush was determined on the board obtained at the highest speed with minimum tension. In addition to information about quality, these results will provide data which may be useful in studying the relationship between Concora flat crush and combined board flat crush for each participant's medium.

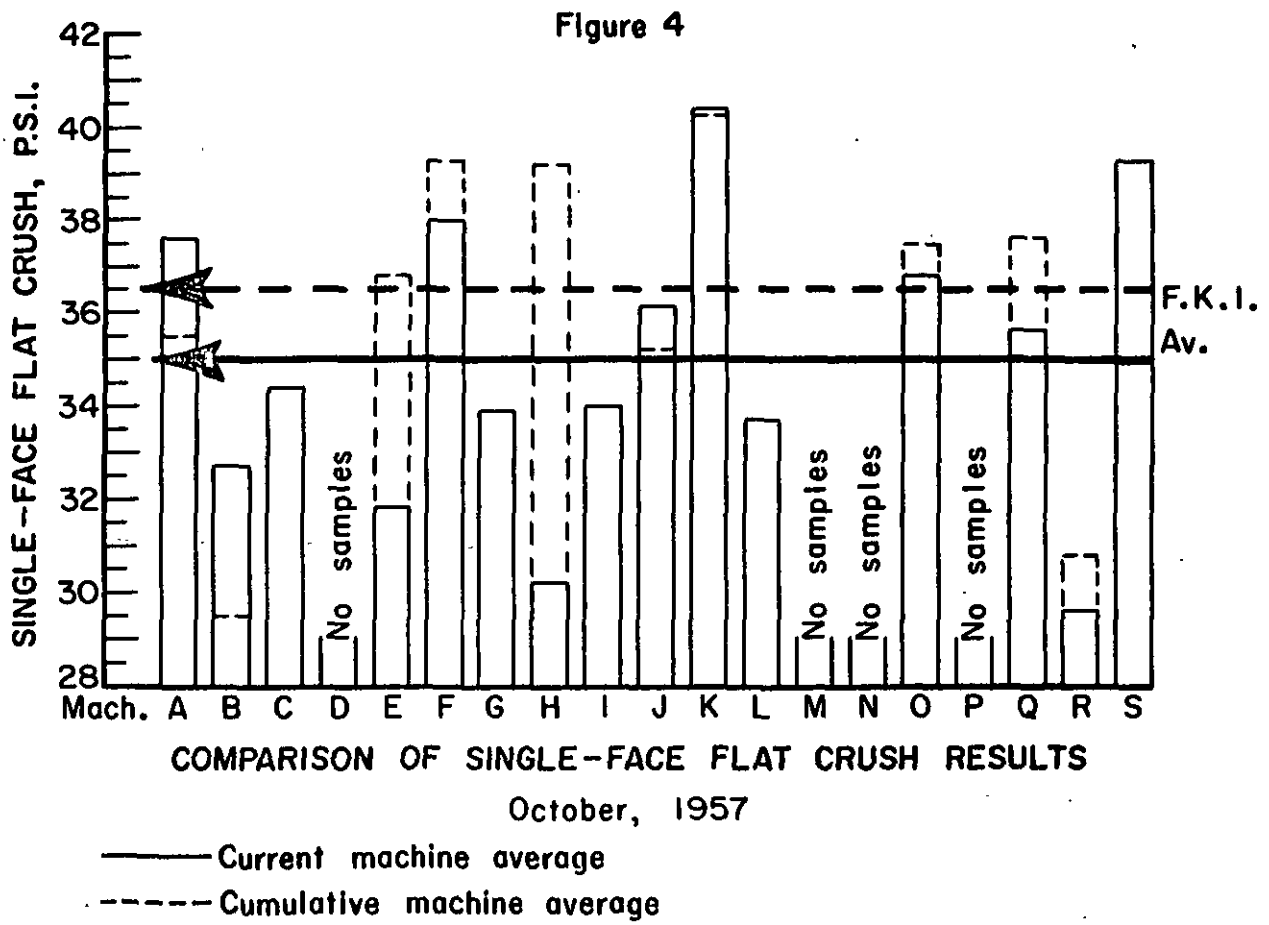
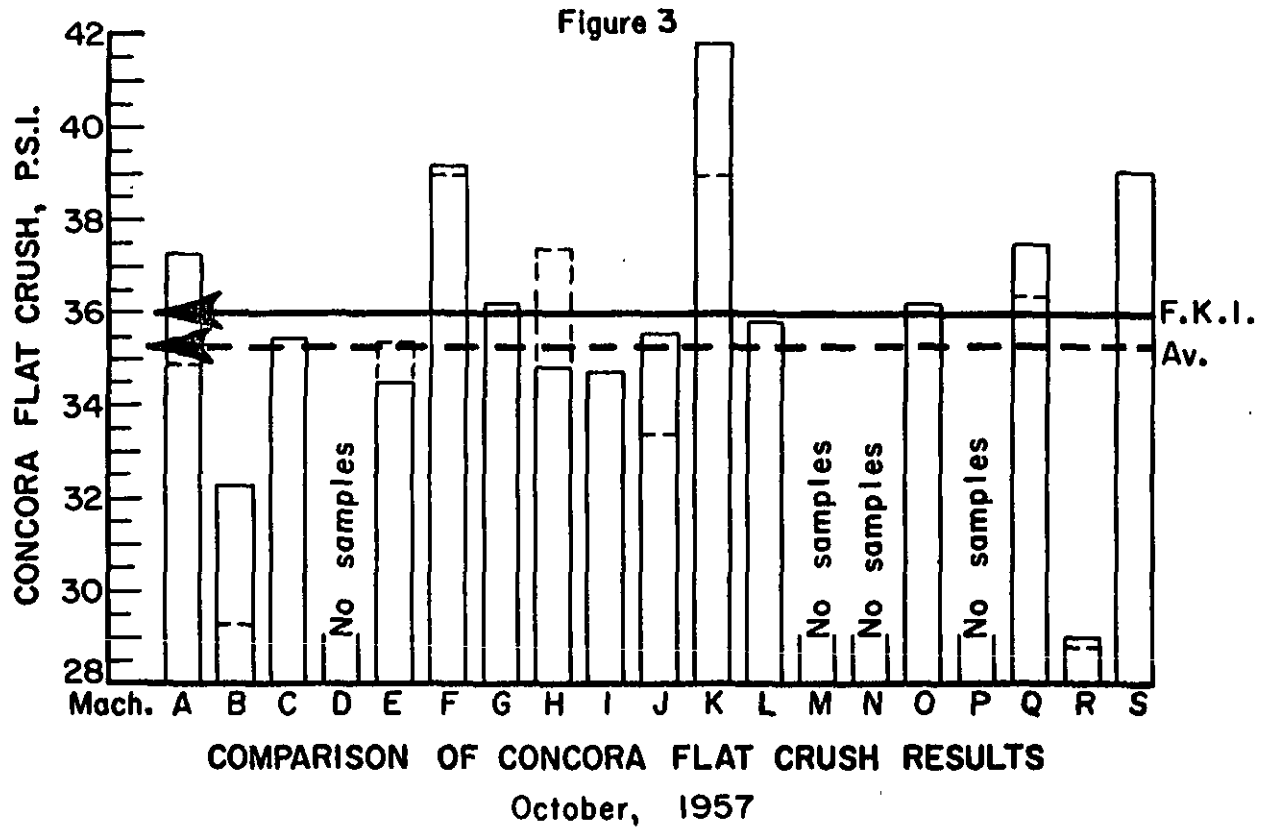
As requested by members of the F.K.B.I., the Concora medium test results are calculated on the basis of pounds of load per unit area rather than on the basis of the formula suggested by the Concora manufacturer and are reported as Concora flat crush test results. In Progress Reports One and Two, the Concora medium test results were reported on the basis of the formula suggested by the Concora manufacturer.

The average test results obtained on the samples of corrugating medium submitted by each participant are shown in Table II and graphically presented in Figures 1 to 4. In addition to a comparison of the test data obtained for the various machines, Table II also presents the current F.K.I. averages, cumulative F.K.I. averages, and the F.K.I. indexes. The current F.K.I. average is the average of test results for all machines participating in the study during a given month. The cumulative F.K.I. average is based on the results for the previous twelve-month period excluding the result

TABLE II  
 SUMMARY OF CURRENT MACHINE AVERAGES  
 October, 1957

Mill Code	Basis Weight, lb.	Caliper, points	Concora Flat Crush p.s.i.	Single-Face Flat Crush p.s.i.
A	26.4	10.0	37.3	37.6
B	26.8	9.9	32.3	32.7
C	26.1	10.0	35.5	34.4
D			No samples submitted.	
E	27.5	11.0	34.5	31.8
F	26.9	11.1	39.2	38.0
G	26.1	10.7	36.2	33.9
H	27.3	11.8	34.8	30.2
I	26.1	10.3	34.7	34.0
J	29.2	10.5	35.6	36.1
K	27.0	9.9	41.8	40.4
L	27.2	10.1	35.8	33.7
M			No samples submitted.	
N			No samples submitted.	
O	28.2	9.5	36.2	36.8
P			No samples submitted.	
Q	26.3	9.8	37.5	35.6
R	26.8	9.4	29.0	29.6
S	27.4	10.3	39.1	39.3
Current F.K.I. Average	27.0	10.3	36.0	35.0
Cumulative F.K.I. Average	27.0	10.3	35.3	36.5
F.K.I. Index, %	100.0	100.0	101.8	95.8





for the current period. The F.K.I. index is obtained as follows:

$$\frac{\text{current F.K.I. average}}{\text{cumulative F.K.I. average}} \times 100 = \text{F.K.I. index (\%)}$$

The F.K.I. index provides a ready means of comparing the current quality with previous results. An index greater than 100% indicates that current quality is higher than the average result for the previous twelve periods; an index below 100% indicates that current quality is lower than the average result for the previous twelve periods.

The test results obtained on the sample lots submitted from the production of each of the machines are shown in Tables III through XVI for machines A through N, respectively. The maximum, minimum, and average test results obtained on each sample lot are shown for all tests except basis weight for which only the average is shown; in addition, the over-all average result for all the sample lots submitted for each machine is shown for each test. The latter over-all averages are reported as "current machine averages." A cumulative machine average is also shown and is calculated by averaging the current machine averages for the previous twelve periods (excluding the current period). Also shown for each machine in Tables III to XXI are the machine factor and machine index which are defined as follows:

$$\frac{\text{current machine average}}{\text{cumulative machine average}} \times 100 = \text{machine factor (\%)}$$

$$\frac{\text{current machine average}}{\text{cumulative F.K.I. average}} \times 100 = \text{machine index (\%)}$$

The machine factor and machine index provide a means for comparing the current machine average with either the previous results for that particular machine or with the cumulative results for all machines--i.e., the cumulative F.K.I. average.

In Table II the current machine averages for the period covered by this report are summarized. It may be noted that basis weight varied from a low of 26.1 lb. for Machines C, G, and I to a high of 29.2 lb. for Machine J. The average basis weight for the fifteen participating machines (current F.K.I. average) was 27.0 lb. per 1000 sq. ft., which is the same as the cumulative F.K.I. average as indicated by the F.K.I. index of 100%. The average results for all machines satisfy the requirements of Rule 41.

Caliper results varied from a low value of 9.4 for Machine R to a high value of 11.8 for Machine H. The current F.K.I. average for caliper was 10.3 points, the same as the cumulative F.K.I. average, as reflected by the F.K.I. index of 100%. The average caliper results for all machines meet the Rule 41 specification.

Concora flat crush test results ranged from a minimum of 29.0 p.s.i. for Machine R to a maximum of 41.8 p.s.i. for Machine K. The current F.K.I. average was 36.0 p.s.i., slightly higher than the cumulative F.K.I. average of 35.3 p.s.i. as indicated by the F.K.I. index of 101.8%.

Machine K had the highest average single-face flat crush of 40.4 p.s.i., and Machine R had the lowest average flat crush, 29.6 p.s.i. The current F.K.I. average for flat crush was 35.0 p.s.i., whereas the cumulative F.K.I. average was 36.5 p.s.i., giving an F.K.I. index of 95.8%.

For the current period, the current F.K.I. averages for basis weight and caliper were the same as their cumulative F.K.I. averages,

whereas the current F.K.I. average for Concora flat crush was slightly higher than its cumulative and the current F.K.I. average for single-face flat crush was slightly lower than its cumulative F.K.I. average.

TABLE III  
 SUMMARY OF TEST RESULTS FOR MACHINE A  
 October, 1957

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points		Concora Flat Crush, p.s.i.		Single-Face Flat Crush, p.s.i.		Runability			
					Max.	Min.	Av.	Max.	Min.	Av.				
A-1	10-22-57	10-25-57	137	26.4	10.0	9.9	10.0	40.2	34.8	37.3	38.6	35.8	37.6	Satisfactory at 600 f.p.m. <sup>a</sup>
Current Machine Average:				26.4	10.0		10.0		37.3				37.6	
Cumulative Machine Average:				26.8			10.5		34.9				35.5	
Machine Factor, %				98.5			95.3		106.9				106.1	
Machine Index, %				97.7			96.7		105.6				103.2	

TABLE IV  
 SUMMARY OF TEST RESULTS FOR MACHINE B  
 October, 1957

B-1	--	10-24-57	22	26.8	10.0	9.1	9.9	33.6	31.2	32.3	35.0	30.4	32.7	Satisfactory at 200 f.p.m. <sup>b</sup>
Current Machine Average:				26.8			9.9		32.3				32.7	
Cumulative Machine Average:				26.6			10.3		29.3				29.5	
Machine Factor, %				100.7			96.0		110.1				110.8	
Machine Index, %				99.1			95.4		91.3				89.6	

<sup>a</sup> With a tension of 1/2 lb./in.  
<sup>b</sup> With minimum tension.

TABLE V  
 SUMMARY OF TEST RESULTS FOR MACHINE C  
 October, 1957

Code	Date Yr-Mo	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points		Concora Flat Crush, p.s.i.		Single-Face Flat Crush, p.s.i.		Runability			
					Max.	Min.	Av.	Max.	Min.	Av.				
C-1	10-2-57	10-9-57	1	26.1	10.0	8.8	9.6	36.6	34.8	36.2	37.0	35.0	35.6	Satisfactory at 600 f.p.m. <sup>a</sup>
C-2	10-3-57	10-9-57	2	26.4	10.2	9.7	10.0	38.4	37.2	38.0	36.2	34.2	35.2	Satisfactory at 600 f.p.m. <sup>a</sup>
C-3	10-9-57	10-18-57	--	26.2	10.8	9.7	10.1	35.4	33.0	34.3	34.4	31.4	33.2	Satisfactory at 600 f.p.m. <sup>a</sup>
C-4	10-11-57	10-18-57	--	25.6	10.4	9.8	10.2	34.8	31.8	33.2	37.2	31.8	33.5	Satisfactory at 600 f.p.m. <sup>a</sup>
Current Machine Average				26.1			10.0			35.5			34.4	
Cumulative Machine Average				--			--			--			--	
Machine Factor, %				--			--			--			--	
Machine Index, %				96.5			96.7			100.3			94.3	

TABLE VI  
 SUMMARY OF TEST RESULTS FOR MACHINE D  
 October, 1957

No samples submitted.

<sup>a</sup> With minimum tension.

TABLE VII

SUMMARY OF TEST RESULTS FOR MACHINE E  
October, 1957

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points		Concora Flat Crush, p.s.i.		Single-face Flat Crush, p.s.i.		Runability	
					Max.	Min.	Av.	Max.	Min.	Av.		Max.
E-1	9-20-57	10-7-57	146	27.6	11.3	11.0	37.2	32.4	34.0	30.0	32.6	Satisfactory at 600 f.p.m. <sup>a</sup>
E-2	9-24-57	10-7-57	147	27.3	11.1	10.5	37.2	31.8	33.0	28.2	31.0	Satisfactory at 600 f.p.m. <sup>a</sup>
Current Machine Average				27.5	11.0		34.5		31.8			
Cumulative Machine Average:				27.1	10.4		35.4		36.8			
Machine Factor, %				101.2	105.6		97.5		86.4			
Machine Index, %				101.7	106.4		97.6		87.3			

TABLE VIII

SUMMARY OF TEST RESULTS FOR MACHINE F  
October, 1957

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points		Concora Flat Crush, p.s.i.		Single-face Flat Crush, p.s.i.		Runability			
					Max.	Min.	Av.	Max.	Min.	Av.		Max.	Min.	Av.
F-1	9-20-57	9-26-57	311	27.0	12.3	10.8	11.3	46.2	40.8	43.1	42.0	37.2	39.5	Satisfactory at 600 f.p.m. <sup>a</sup>
F-2	9-24-57	10-1-57	312	27.2	11.8	11.0	11.2	42.0	37.2	39.2	38.8	36.6	37.7	Satisfactory at 600 f.p.m. <sup>a</sup>
F-3	9-27-57	10-1-57	313	26.7	11.3	10.6	11.0	43.8	36.6	40.2	41.2	39.2	39.8	Satisfactory at 600 f.p.m. <sup>a</sup>
F-4	10-1-57	10-7-57	314	26.8	11.5	10.7	11.0	42.6	36.0	39.2	40.2	35.0	38.0	Satisfactory at 600 f.p.m. <sup>a</sup>
F-5	10-7-57	10-11-57	315	27.1	10.9	10.6	10.8	42.6	39.6	41.5	39.0	37.0	38.2	Satisfactory at 600 f.p.m. <sup>b</sup>
F-6	10-8-57	10-11-57	316	26.9	11.0	10.4	10.8	46.8	39.6	41.5	37.4	34.8	36.0	Satisfactory at 600 f.p.m. <sup>b</sup>
F-7	10-11-57	10-14-57	317	26.8	12.0	11.0	11.3	40.8	35.4	38.0	38.4	36.6	37.3	Satisfactory at 600 f.p.m. <sup>b</sup>
F-8	10-15-57	10-18-57	318	26.8	12.0	11.0	11.6	37.8	33.6	35.4	43.0	39.4	40.7	Satisfactory at 600 f.p.m. <sup>b</sup>
F-9	10-18-57	10-21-57	319	26.5	11.2	10.7	11.0	37.2	32.4	34.9	37.4	33.0	34.7	Satisfactory at 600 f.p.m. <sup>b</sup>
Current Machine Average				26.9			11.1		39.2			38.0		
Cumulative Machine Average				26.6			10.8		39.0			39.3		
Machine Factor, %				100.9			102.4		100.5			96.6		
Machine Index, %				99.5			107.4		111.0			104.2		

<sup>a</sup> With a tension of 1/2 lb./in.

<sup>b</sup> With minimum tension

TABLE IX  
 SUMMARY OF TEST RESULTS FOR MACHINE G  
 October, 1957

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, P.S.I.			Single-Face Flat Crush, P.S.I.			Runability
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
G-1	10-9-57	10-18-57	--	25.7	10.8	9.8	10.5	37.8	33.6	35.9	34.2	31.6	33.0	Satisfactory at 600 f.p.m. <sup>a</sup>
G-2	10-12-57	10-18-57	--	26.4	11.8	9.8	10.9	39.6	33.6	36.5	35.6	33.6	34.8	Satisfactory at 600 f.p.m. <sup>b</sup>
Current Machine Average				26.1			10.7		36.2				33.9	
Cumulative Machine Average				--			--		--				--	
Machine Factor, %				--			--		--				--	
Machine Index, %				96.5			103.5		102.4				93.1	

TABLE X  
 SUMMARY OF TEST RESULTS FOR MACHINE H  
 October, 1957

H-1	10-10-57	10-16-57	227	27.3	12.0	11.5	11.8	37.2	33.0	34.8	32.2	29.2	30.2	Satisfactory at 600 f.p.m. <sup>b</sup>
Current Machine Average				27.3			11.8		34.8				30.2	
Cumulative Machine Average				27.1			11.5		37.4				39.2	
Machine Factor, %				100.8			102.7		93.1				77.1	
Machine Index, %				101.2			114.0		98.5				82.8	

<sup>a</sup> With a tension of 1/2 lb./in.

<sup>b</sup> With minimum tension

TABLE XI  
 SUMMARY OF TEST RESULTS FOR MACHINE I  
 October, 1957

Code	Date Yade	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runability
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
I-1	10-9-57	10-18-57	--	25.8	10.8	9.7	10.4	37.2	31.8	35.2	34.4	30.2	32.7	Satisfactory at 600 f.p.m. <sup>a</sup>
I-2	10-10-57	10-18-57	--	26.5	10.4	9.7	10.0	37.2	34.8	36.4	36.4	36.0	36.2	Satisfactory at 600 f.p.m. <sup>a</sup>
I-3	10-14-57	10-18-57	--	25.9	10.9	10.5	10.7	34.2	31.2	32.6	34.2	32.4	33.1	Satisfactory at 600 f.p.m. <sup>a</sup>
Current Machine Average				26.1			10.3			34.7			34.0	
Cumulative Machine Average				--			--			--			--	
Machine Factor, %				--			--			--			--	
Machine Index, %				96.5			100.1			98.2			93.3	

<sup>a</sup> With minimum tension.

TABLE XII  
 SUMMARY OF TEST RESULTS FOR MACHINE J  
 October, 1957

Code	Date Yr-Mo	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points		Concora Flat Crush, P.S.I.		Single-Face Flat Crush, P.S.I.		Runability		
					Max.	Min.	Max.	Min.	Max.	Min.		Av.	Av.
J-1	9-24-57	10-1-57	124	27.5	10.2	9.9	10.0	37.2	34.8	35.8	32.8	33.5	Satisfactory at 600 f.p.m. <sup>a</sup>
J-2	9-26-57	10-1-57	125	28.9	10.9	10.2	10.5	38.4	34.2	36.2	33.4	35.3	Satisfactory at 600 f.p.m. <sup>a</sup>
J-3	10-1-57	10-4-57	125	29.9	11.2	10.0	10.9	39.0	33.0	35.9	37.0	35.8	Satisfactory at 600 f.p.m. <sup>b</sup>
J-4	10-3-57	10-7-57	126	30.6	11.0	10.0	10.5	39.0	36.0	37.3	39.0	37.7	Satisfactory at 600 f.p.m. <sup>b</sup>
J-5	10-8-57	10-11-57	127	29.6	10.8	10.3	10.7	36.6	33.6	36.0	41.0	38.6	Satisfactory at 600 f.p.m. <sup>b</sup>
J-6	10-10-57	10-14-57	128	28.7	10.7	10.0	10.3	35.4	33.6	34.6	38.2	36.9	Satisfactory at 600 f.p.m. <sup>b</sup>
J-7	10-15-57	10-21-57	129	29.0	11.1	10.1	10.6	34.2	32.4	33.5	36.6	35.0	Satisfactory at 600 f.p.m. <sup>c</sup>
Current Machine Average				29.2			10.5			35.6		36.1	
Cumulative Machine Average				29.4			11.4			33.4		35.2	
Machine Factor, %				99.1			92.0			106.7		102.5	
Machine Index, %				108.0			101.5			100.7		99.0	

<sup>a</sup> With a tension of 1 lb./in.

<sup>b</sup> With minimum tension.

<sup>c</sup> With a tension of 1-1/2 lb./in.

SUMMARY OF TEST RESULTS FOR MACHINE K  
October, 1957

TABLE XIII

Code	Date Made	Date Recd.	MILL Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runability
					Max.	Min.	Average	Max.	Min.	Average	Max.	Min.	Average	
K-1	9-21-57	9-30-57	162	26.3	9.9	9.3	9.7	44.4	37.8	41.4	40.0	37.0	38.9	Satisfactory at 400 f.p.m. <sup>a</sup>
K-2	9-24-57	10-1-57	163	26.7	10.9	10.2	10.5	43.2	37.2	41.5	41.0	36.0	39.3	Satisfactory at 400 f.p.m. <sup>a</sup>
K-3	9-25-57	10-1-57	164	27.9	10.6	9.5	10.1	46.8	44.4	46.0	43.4	41.6	42.6	Satisfactory at 600 f.p.m. <sup>b</sup>
K-4	9-27-57	10-1-57	165	26.8	10.1	9.7	9.9	46.8	43.2	44.5	43.4	40.8	42.5	Satisfactory at 600 f.p.m. <sup>b</sup>
K-5	10-1-57	10-7-57	166	26.6	10.5	9.9	10.1	43.8	38.4	41.0	42.2	40.0	41.2	Satisfactory at 550 f.p.m. <sup>c</sup>
K-6	10-1-57	10-7-57	167	26.8	10.1	9.1	9.9	45.0	40.2	43.0	43.8	41.0	42.6	Satisfactory at 500 f.p.m. <sup>c</sup>
K-7	10-3-57	10-7-57	168	26.8	10.5	9.8	10.0	47.4	43.2	45.1	46.0	41.0	42.8	Satisfactory at 550 f.p.m. <sup>c</sup>
K-8	10-4-57	10-11-57	169	27.2	10.2	9.5	9.9	45.0	40.2	42.0	42.2	39.0	40.5	Satisfactory at 500 f.p.m. <sup>c</sup>
K-9	10-8-57	10-14-57	170	26.3	10.2	9.7	9.8	40.8	34.2	38.0	39.6	35.2	37.2	Satisfactory at 600 f.p.m. <sup>c</sup>
K-10	10-10-57	10-15-57	171	27.4	9.8	9.0	9.5	42.6	40.8	41.9	40.6	37.6	39.0	Satisfactory at 600 f.p.m. <sup>c</sup>
K-11	10-15-57	10-21-57	172	27.8	10.1	9.9	10.0	40.2	36.6	37.9	41.0	37.8	39.4	Satisfactory at 550 f.p.m. <sup>c</sup>
K-12	10-17-57	10-21-57	174	26.8	10.0	9.2	9.7	40.2	37.8	38.8	40.6	37.6	39.1	Satisfactory at 600 f.p.m. <sup>c</sup>
Current Machine Average				27.0	9.9					41.8			40.4	
Cumulative Machine Average				27.0						39.0			40.3	
Machine Factor, %				100.0						107.1			100.3	
Machine Index, %				99.8						118.2			110.9	

<sup>a</sup> With a tension of 1/2-lb./in.

<sup>b</sup> With a tension of 1 lb./in.

<sup>c</sup> With minimum tension.

TABLE XIV

SUMMARY OF TEST RESULTS FOR MACHINE L  
 October, 1957

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runability
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
L-1	9-28-57	10-10-57	2166	27.5	10.6	10.0	10.1	40.2	34.8	37.8	36.0	34.0	35.0	Satisfactory at 600 f.p.m. <sup>a</sup> Satisfactory at 600 f.p.m. <sup>b</sup>
L-2	9-29-57	10-10-57	2285	26.9	10.2	9.8	10.0	36.0	31.8	33.7	34.6	31.0	32.4	
Current Machine Average				27.2			10.1		35.8				33.7	
Cumulative Machine Average				--			--		--				--	
Machine Factor, %				--			--		--				--	
Machine Index, %				100.6			97.3		101.2				92.4	

TABLE XV

SUMMARY OF TEST RESULTS FOR MACHINE M  
 October, 1957

No samples submitted.

TABLE XVI

SUMMARY OF TEST RESULTS FOR MACHINE N  
 October, 1957

No samples submitted.

<sup>a</sup> With a tension of 1-1/2 lb./in.

<sup>b</sup> With a tension of 1/2 lb./in.

TABLE XVII  
 SUMMARY OF TEST RESULTS FOR MACHINE O  
 October, 1957

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points		Concora Flat Crush, P.s.i.		Single-Face Flat Crush, P.s.i.		Runability			
					Max.	Min.	Av.	Max.	Min.	Av.		Max.	Min.	Av.
J-1	9-25--57	10-1-57	113	28.4	10.0	9.1	9.7	39.0	36.0	37.7	38.8	34.2	36.3	Satisfactory at 350 f.p.m. <sup>a</sup>
J-2	--	10-14-57	113	28.0	9.6	8.5	9.3	37.2	32.4	34.7	40.0	35.2	37.4	Satisfactory at 500 f.p.m. <sup>b</sup>
Current Machine Average				28.2			9.5			36.2			36.8	
Cumulative Machine Average				28.4			9.8			36.2			37.5	
Machine Factor, %				99.5			97.1			100.0			98.1	
Machine Index, %				104.6			91.9			102.4			101.0	

TABLE XVIII  
 SUMMARY OF TEST RESULTS FOR MACHINE P  
 October, 1957

No samples submitted.

<sup>a</sup> With a tension of 1/2 lb./in.

<sup>b</sup> With minimum tension.

TABLE XIX  
 SUMMARY OF TEST RESULTS FOR MACHINE Q  
 October, 1957

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runability	
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.		
Q-1	9-25-57	10-7-57	31	26.1	10.3	9.9	10.0	43.2	36.0	38.6	38.0	34.6	35.8	Satisfactory at 600 f.p.m. <sup>a</sup>	
Q-2	9-26-57	10-7-57	32	26.3	10.0	9.0	9.6	38.4	34.8	36.7	40.6	35.0	36.7	Satisfactory at 600 f.p.m. <sup>b</sup>	
Q-3	10-1-57	10-7-57	33	26.2	10.1	9.8	10.0	40.2	38.4	39.5	38.6	34.0	36.3	Satisfactory at 600 f.p.m. <sup>b</sup>	
Q-4	10-1-57	10-7-57	34	26.0	10.2	9.3	9.9	40.8	37.8	39.4	38.0	34.2	36.0	Satisfactory at 600 f.p.m. <sup>a</sup>	
Q-5	10-16-57	10-21-57	35	26.8	10.0	9.5	9.8	41.4	39.6	40.3	40.2	35.0	37.1	Satisfactory at 600 f.p.m. <sup>c</sup>	
Q-6	10-16-57	10-21-57	36	25.7	10.1	9.3	9.8	34.2	31.2	32.9	35.6	33.6	34.5	Satisfactory at 600 f.p.m. <sup>c</sup>	
Q-7	10-17-57	10-22-57	37	26.8	9.8	9.1	9.5	37.8	33.6	35.0	35.6	32.0	33.2	Satisfactory at 600 f.p.m. <sup>c</sup>	
Current Machine Average				26.3		9.8	9.8			37.5				35.6	
Cumulative Machine Average				26.8		9.9	9.9			36.4				37.6	
Machine Factors, %				98.0		98.7	98.7			103.1				94.7	
Machine Index, %				97.3		94.9	94.9			106.1				97.8	

<sup>a</sup> With a tension of 1/2 lb./in.

<sup>b</sup> With minimum tension

<sup>c</sup> With a tension of 1-1/2 lb./in.

TABLE XX

SUMMARY OF TEST RESULTS FOR MACHINE R  
October, 1957

Code	Date Year	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runability
					Max.	Min.	Average	Max.	Min.	Average	Max.	Min.	Average	
R-1	9-26-57	10-14-57	33	26.3	9.6	9.0	9.2	34.2	31.2	32.6	36.2	35.0	35.8	Satisfactory at 600 f.p.m. <sup>a</sup>
R-2	9-26-57	10-14-57	34	26.0	9.7	8.7	9.2	36.6	30.0	33.8	35.8	33.6	34.2	Satisfactory at 600 f.p.m. <sup>b</sup>
R-3	9-26-57	10-14-57	35	25.7	9.2	8.8	9.0	35.4	29.4	32.2	36.4	31.6	34.3	Satisfactory at 600 f.p.m. <sup>b</sup>
R-4	10-14-57	10-21-57	36	27.5	10.0	9.2	9.7	24.6	21.6	23.8	24.8	22.0	23.2	Satisfactory at 550 f.p.m. <sup>c</sup>
R-5	10-14-57	10-21-57	37	27.6	10.1	9.1	9.8	28.8	25.2	26.4	27.0	23.0	24.8	Satisfactory at 600 f.p.m. <sup>c</sup>
R-6	10-14-57	10-21-57	38	27.6	10.0	9.4	9.8	29.4	21.6	25.3	26.6	23.8	25.6	Satisfactory at 600 f.p.m. <sup>c</sup>
Current Machine Average				26.8		9.4	9.4		29.0		29.0		29.6	
Cumulative Machine Average				27.4		9.5	9.5		28.8		28.8		30.8	
Machine Factor, %				97.9		99.3	99.3		100.8		100.8		96.2	
Machine Index, %				99.2		91.4	91.4		82.1		82.1		81.3	

TABLE XXI

SUMMARY OF TEST RESULTS FOR MACHINE S  
October, 1957

S-1	10-15-57	10-21-57	173	27.6	10.8	10.1	10.3	40.8	34.8	37.9	41.4	37.8	39.5	Satisfactory at 600 f.p.m. <sup>c</sup>
S-2	10-17-57	10-21-57	175	27.2	10.8	10.0	10.3	42.6	37.2	40.3	40.8	37.0	39.0	Satisfactory at 600 f.p.m. <sup>c</sup>
Current Machine Average				27.4		10.3	10.3		39.1		39.1		39.3	
Cumulative Machine Average				--		--	--		--		--		--	
Machine Factor, %				--		--	--		--		--		--	
Machine Index, %				101.5		99.8	99.8		110.7		110.7		107.7	

<sup>a</sup> With a tension of 1-1/2 lb./in.

<sup>b</sup> With a tension of 1/2 lb./in.

<sup>c</sup> With minimum tension.