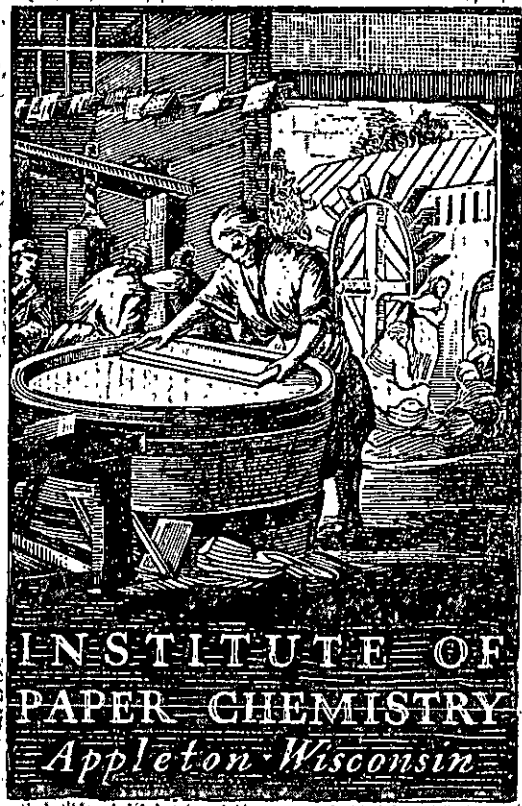


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**CONTINUOUS EVALUATION OF
CORRUGATING MEDIUM**

Project 1108-17

Progress Report Twenty-seven

to

FOURDRINIER KRAFT BOARD INSTITUTE, INC

February 1, 1958

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 January, ninety-five different sample lots of corrugating medium, submitted from the production of nineteen 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	3
B	10
C	0
D	3
E	9
F	5
G	0
H	0
I	8
J	6
K	10
L	7
M	2
N	4
O	5
P	0
Q	6
R	4
S	0
T	5
U	2
V	2
W	0
X	2
Y	2
Total	<u>95</u>

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.

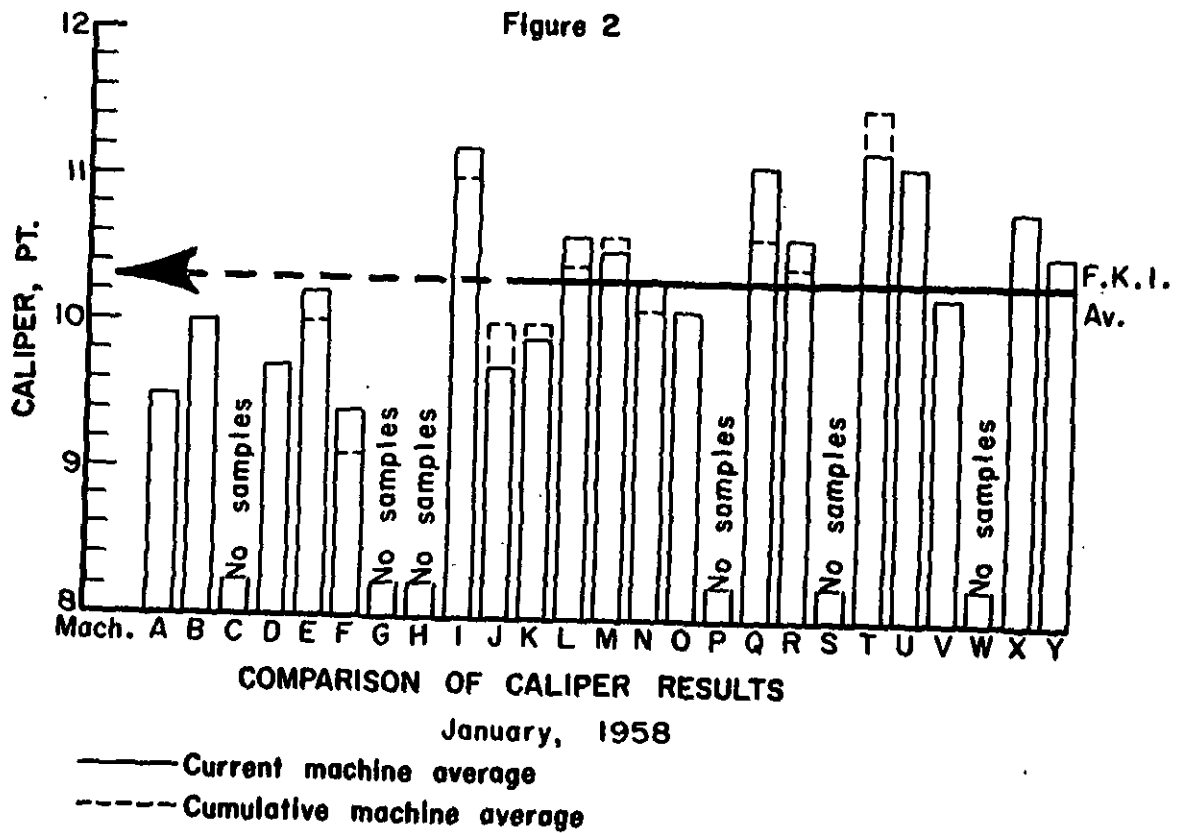
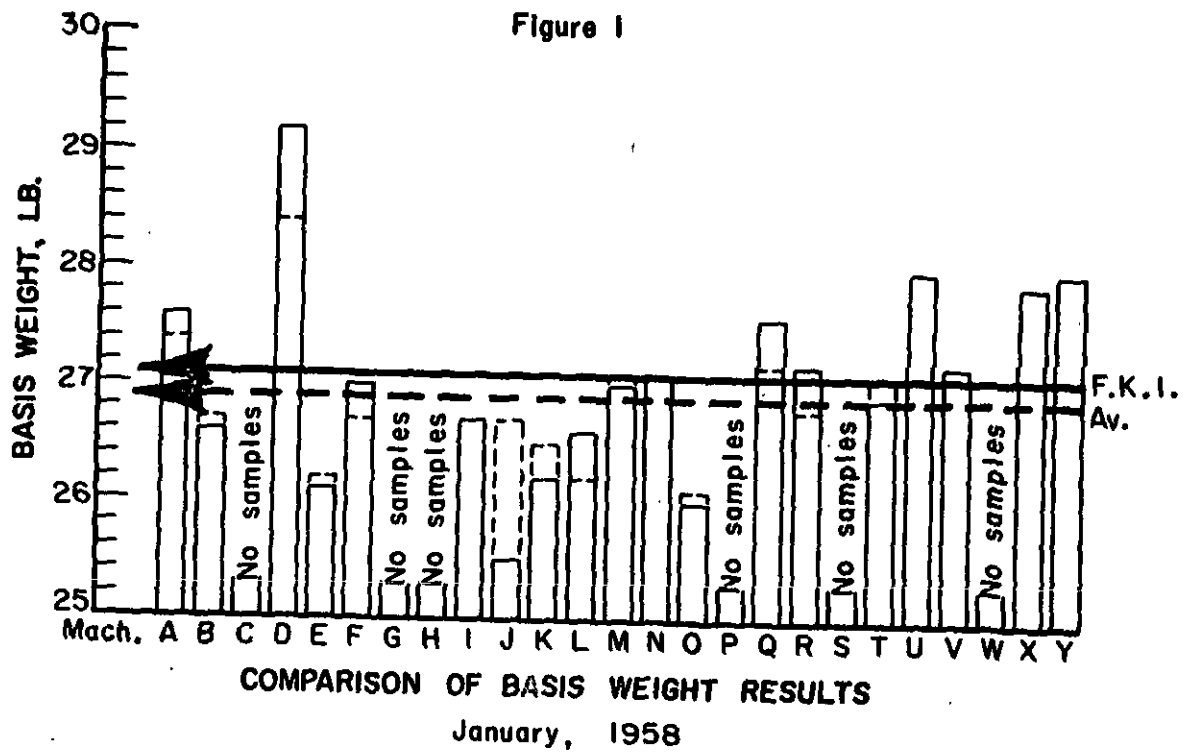
Flat crush was determined on the board obtained at the highest speed with minimum tension. In addition to information about quality, these results will provide data which may be useful in studying the relationship between Concora flat crush and combined board flat crush for each participant's medium.

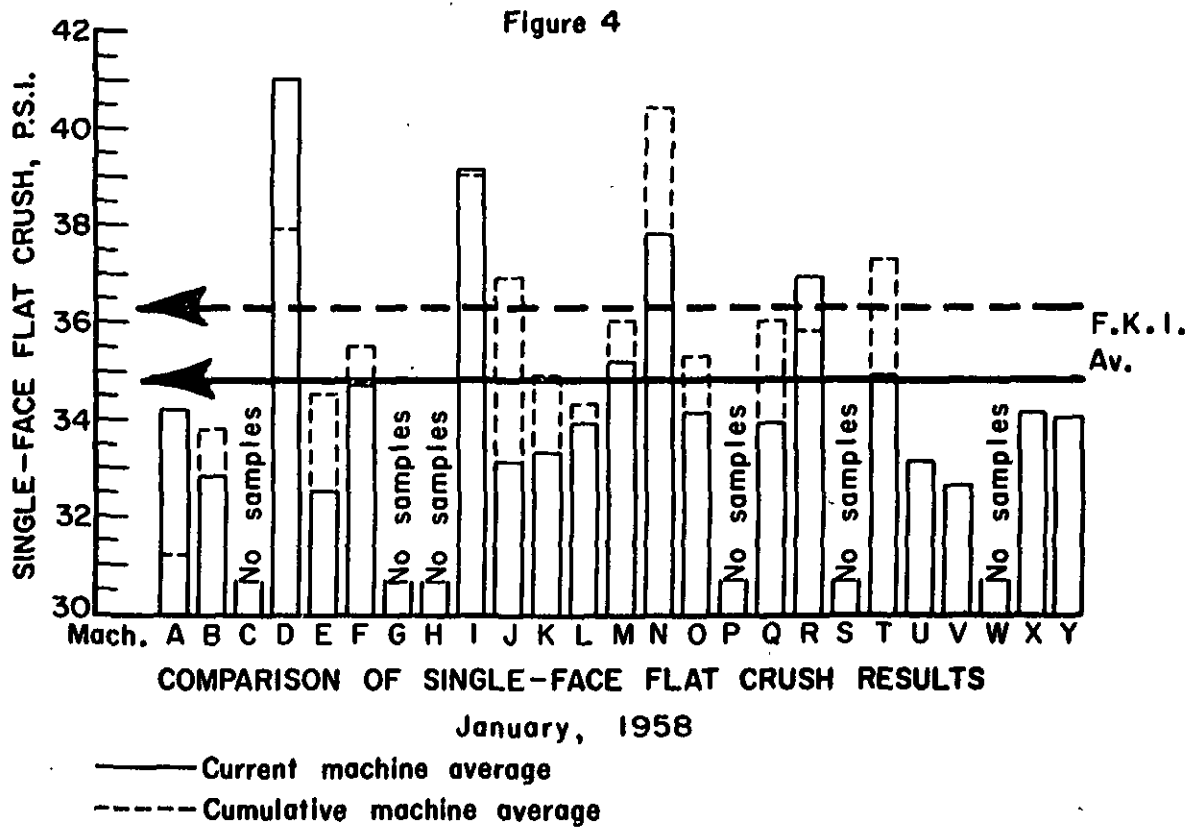
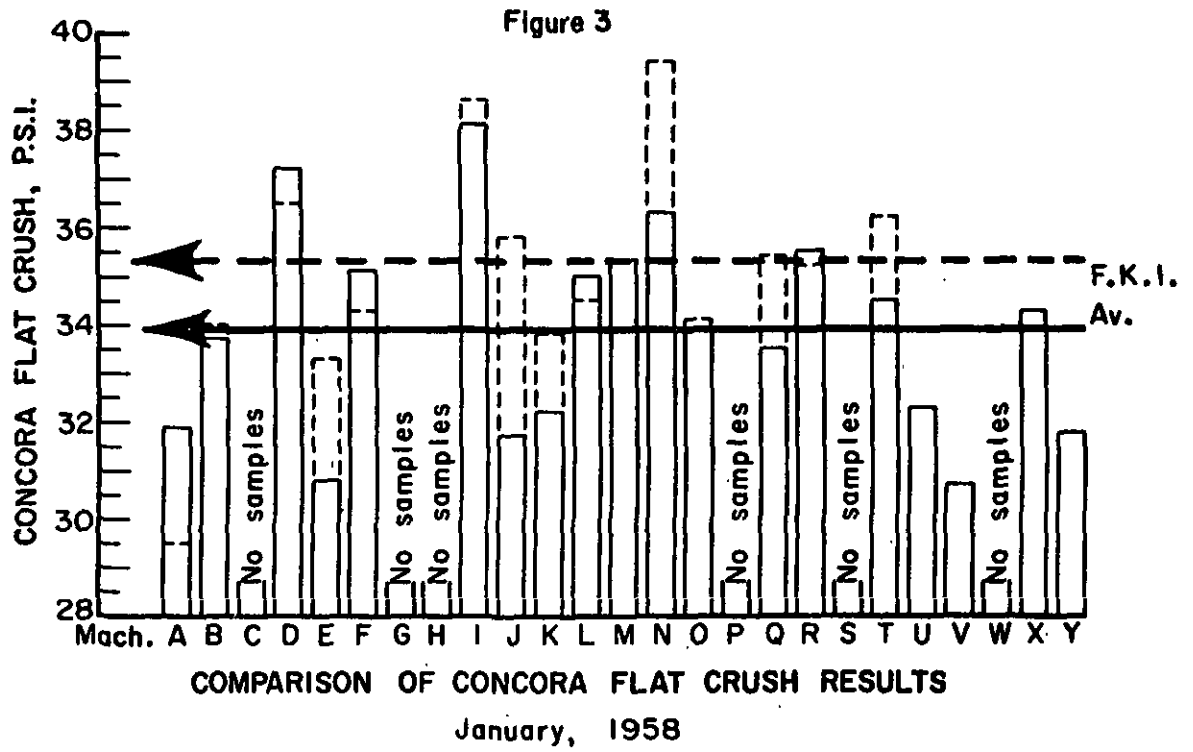
As requested by members of the F.K.B.I., the Concora medium test results are calculated on the basis of pounds of load per unit area rather than on the basis of the formula suggested by the Concora manufacturer and are reported as Concora flat crush test results. In Progress Reports One and Two, the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

TABLE II
 SUMMARY OF CURRENT MACHINE AVERAGES
 January, 1958

Machine Code	Basis Weight, lb.	Caliper, points	Concora Flat Crush, p.s.i.	Single-Face Flat Crush, p.s.i.
A	27.6	9.5	31.9	34.2
B	26.6	10.0	33.7	32.8
C	No samples submitted.			
D	29.2	9.7	37.2	41.0
E	26.1	10.2	30.8	32.5
F	27.0	9.4	35.1	34.7
G	No samples submitted.			
H	No samples submitted.			
I	26.7	11.2	38.1	39.1
J	25.5	9.7	31.7	33.1
K	26.2	9.9	32.2	33.3
L	26.6	10.6	35.0	33.9
M	27.0	10.5	35.3	35.2
N	27.1	10.3	36.3	37.8
O	26.0	10.1	33.9	34.1
P	No samples submitted.			
Q	27.6	11.1	33.5	33.9
R	27.2	10.6	35.5	36.9
S	No samples submitted.			
T	26.9	11.2	34.5	34.9
U	28.0	11.1	32.3	33.1
V	27.2	10.2	30.7	32.6
W	No samples submitted.			
X	27.9	10.8	34.3	34.1
Y	28.0	10.5	31.8	34.0
Current F.K.I. Average				
Cumulative F.K.I. Average				
F.K.I. Index, %				
	27.1	10.3	33.9	34.8
	26.9	10.3	35.3	36.3
	100.5	100.0	96.0	95.9





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 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 XXVII for machines A through Y, 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 XXVII 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 25.5 lb. for Machine J to a high of 29.2 lb. for Machine D. The average basis weight for the nineteen participating machines (current F.K.I. average) was 27.1 lb. per 1000 sq. ft., which is slightly higher than the cumulative F.K.I. average of 26.9 lb. per 1000 sq. ft. as indicated by the F.K.I. index of 100.5%. The average results for all machines except J satisfy the requirements of Rule 41.

Caliper results varied from a low value of 9.4 points for Machine F to a high value of 11.2 points shared by Machines I and T. 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 100.0%. The average caliper results for all machines meet the Rule 41 specification.

Concora flat crush test results ranged from a minimum of 30.7 p.s.i. for Machine V to a maximum of 38.1 p.s.i. for Machine I. The current F.K.I. average was 33.9 p.s.i., slightly lower than the cumulative F.K.I. average of 35.3 p.s.i. as indicated by the F.K.I. index of 96.0%.

Machine D had the highest average single-face flat crush of 41.0 p.s.i., and Machine E had the lowest, 32.5 p.s.i. The current F.K.I. average

for flat crush was 34.8 p.s.i., whereas the cumulative F.K.I. average was 36.3 p.s.i., giving an F.K.I. index of 95.9%.

For the current period, the current F.K.I. average for basis weight was slightly higher than the cumulative F.K.I. average, the current F.K.I. average for caliper was the same as the cumulative F.K.I. average, and the current F.K.I. averages for Concora flat crush and single-face flat crush were lower than their respective cumulative F.K.I. averages.

TABLE III
 SUMMARY OF TEST RESULTS FOR MACHINE A
 January, 1958

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.		Rangeability		
					Max.	Av.	Max.	Min.	Max.	Min.		Av.	
A-1	12-14-57	1-13-58	51	27.6	9.9	8.9	32.4	28.6	30.8	36.2	34.0	35.2	Satisfactory at 600 f.p.m. ^a
A-2	12-14-57	1-13-58	52	27.5	9.8	8.7	34.2	30.6	32.6	35.6	32.6	33.7	Satisfactory at 600 f.p.m. ^a
A-3	12-14-57	1-13-58	53	27.6	9.9	9.2	34.2	30.6	32.3	34.4	33.2	33.5	Satisfactory at 600 f.p.m. ^a
Current Machine Average				27.6	9.5	9.5	31.9	31.9	31.9	34.2	34.2	34.2	
Cumulative Machine Average				27.4	9.5	9.5	29.5	29.5	29.5	31.2	31.2	31.2	
Machine Factor, %				100.7	100.0	100.0	108.1	108.1	108.1	109.6	109.6	109.6	
Machine Index, %				102.3	91.7	91.7	90.5	90.5	90.5	94.2	94.2	94.2	

^a With tension of 1-1/2 lb./in.

TABLE IV
 SUMMARY OF TEST RESULTS FOR MACHINE B
 January, 1958

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.	Max.	Min.	Max.	Min.		Av.	Av.	
E-1	12-3-57	12-24-57	--	27.2	10.0	9.7	10.0	34.8	31.2	33.1	33.4	32.2	32.9	Satisfactory at 600 f.p.m. ^a
E-2	12-4-57	12-24-57	--	27.3	10.4	9.8	10.1	35.4	33.6	34.4	34.4	32.4	33.1	Satisfactory at 600 f.p.m. ^b
E-3	12-6-57	12-31-57	--	26.9	10.2	9.8	10.0	34.8	30.0	33.2	34.4	31.8	33.3	Satisfactory at 600 f.p.m. ^b
E-4	12-12-57	12-31-57	--	26.8	10.9	10.0	10.7	34.8	30.6	33.1	32.2	30.2	31.4	Satisfactory at 600 f.p.m. ^a
E-5	12-17-57	1-7-58	--	26.6	10.5	9.8	10.0	34.2	31.2	33.2	32.6	29.8	31.5	Satisfactory at 600 f.p.m. ^a
E-6	12-20-57	1-7-58	--	27.0	10.2	9.8	10.0	37.8	35.4	36.7	34.8	33.2	34.1	Satisfactory at 600 f.p.m. ^b
E-7	12-23-57	1-13-58	--	25.7	10.0	9.5	9.9	34.8	32.4	33.1	31.6	30.8	31.2	Satisfactory at 600 f.p.m. ^c
E-8	12-28-57	1-13-58	--	26.6	10.0	9.6	9.8	37.2	35.4	36.5	35.6	32.6	34.0	Satisfactory at 600 f.p.m. ^b
E-9	12-31-57	1-16-58	--	25.9	10.2	9.4	9.8	31.8	30.6	31.2	33.6	29.4	32.1	Satisfactory at 600 f.p.m. ^b
E-10	1-1-58	1-16-58	--	26.4	10.7	9.8	10.0	33.6	30.6	32.4	35.4	31.6	34.2	Satisfactory at 600 f.p.m. ^b
Current Machine Average				26.6	10.0		10.0			33.7			32.8	
Cumulative Machine Average				26.7	10.0		10.0			34.0			33.8	
Machine Factor, \bar{x}				99.8	100.0		100.0			99.0			97.0	
Machine Index, \bar{x}				98.8	97.1		97.1			95.5			90.4	

TABLE V
 SUMMARY OF TEST RESULTS FOR MACHINE C
 January, 1958

No samples submitted.

^a With tension of 1/2 lb./in.
^b With tension of 1-1/2 lb./in.
^c With tension of 1 lb./in.

TABLE VI
 SUMMARY OF TEST RESULTS FOR MACHINE D
 January, 1958

Code	Date Recd.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points	Concora Flat Crush, p.s.i.		Single-Face Flat Crush, p.s.i.		Runability				
				Max.	Av.	Max.	Av.					
D-1	12-14-57	29.3	10.0	8.9	9.5	45.0	34.2	37.7	40.6	38.6	39.7	Satisfactory at 425 f.p.m. ^a
D-2	--	29.5	10.0	9.0	9.7	36.6	35.4	36.0	44.4	38.8	41.2	Satisfactory at 325 f.p.m. ^a
D-3	1-2-58	28.8	10.0	9.7	9.9	39.6	35.4	37.8	44.2	40.2	42.0	Satisfactory at 425 f.p.m. ^a
Current Machine Average		29.2			9.7			37.2			41.0	
Cumulative Machine Average		28.4			9.7			36.5			37.9	
Machine Factor, %		102.9			100.0			101.8			108.0	
Machine Index, %		108.4			93.7			105.3			113.0	

^a With minimum tension.

TABLE VII
 SUMMARY OF TEST RESULTS FOR MACHINE E
 January, 1958

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.	Max.	Av.	Max.	Av.				
E-1	12-13-57	12-19-57	--	26.3	10.3	9.8	10.0	33.6	30.0	31.7	34.0	31.8	33.2	Satisfactory at 600 f.p.m. ^a
E-2	12-20-57	12-30-57	--	26.7	10.7	10.0	10.3	36.0	34.2	35.3	33.8	31.8	33.0	Satisfactory at 600 f.p.m. ^a
E-3	12-27-57	1-6-58	--	26.2	11.2	10.5	10.8	31.8	30.6	31.2	31.8	30.0	30.5	Satisfactory at 600 f.p.m. ^b
E-4	12-31-57	1-9-58	--	25.8	10.5	10.0	10.1	31.2	26.4	29.2	32.4	29.0	31.0	Satisfactory at 600 f.p.m. ^c
E-5	1-3-58	1-9-58	--	25.9	10.5	10.0	10.2	30.0	26.4	28.6	34.8	32.8	33.7	Satisfactory at 600 f.p.m. ^c
E-6	1-7-58	1-15-58	--	26.9	10.0	9.2	9.8	30.6	28.2	29.2	32.8	32.0	32.4	Satisfactory at 600 f.p.m. ^b
E-7	1-10-58	1-15-58	--	25.7	10.5	9.9	10.1	29.4	27.6	28.9	32.4	30.6	31.6	Satisfactory at 600 f.p.m. ^a
E-8	1-14-58	1-23-58	--	25.3	10.5	9.6	10.0	32.4	30.0	31.1	34.0	32.0	33.0	Satisfactory at 600 f.p.m. ^c
E-9	1-17-58	1-23-58	--	26.1	10.6	9.8	10.3	32.4	31.2	32.0	35.6	33.2	34.4	Satisfactory at 600 f.p.m. ^c
Current Machine Average				26.1			10.2			30.8			32.5	
Cumulative Machine Average				26.2			10.0			33.3			34.5	
Machine Factor, %				99.8			101.7			92.4			94.1	
Machine Index, %				96.9			98.5			87.3			89.7	

^a With minimum tension.
^b With tension of 1 lb./in.
^c With tension of 1/2 lb./in.

TABLE VIII
 SUMMARY OF TEST RESULTS FOR MACHINE F
 January, 1958

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	12-14-57	12-23-57	--	26.9	9.9	9.0	9.5	38.4	30.0	34.8	37.0	34.6	35.5	Satisfactory at 600 f.p.m. ^a
F-2	12-21-57	12-30-57	148	26.3	9.3	8.9	9.1	34.8	30.0	33.2	33.8	31.8	33.0	Satisfactory at 600 f.p.m. ^b
F-3	12-28-57	1-2-58	149	26.6	10.3	9.3	9.8	36.0	31.2	33.1	33.8	31.2	32.8	Satisfactory at 600 f.p.m. ^c
F-4	12-29-57	1-10-58	150	27.8	10.0	9.1	9.7	40.8	34.2	37.4	38.4	34.8	36.1	Satisfactory at 600 f.p.m. ^b
F-5	12-30-57	1-6-58	151	27.5	9.2	8.9	9.0	39.0	34.8	36.8	37.6	34.0	36.3	Satisfactory at 600 f.p.m. ^d
Current Machine Average														
				27.0			9.4			35.1			34.7	
Cumulative Machine Average														
				26.7			9.1			34.3			35.5	
Machine Factor, %														
				101.0			103.8			102.3			97.8	
Machine Index, %														
				100.3			91.1			99.4			95.8	

TABLE IX
 SUMMARY OF TEST RESULTS FOR MACHINE G
 January, 1958

No samples submitted.

TABLE X
 SUMMARY OF TEST RESULTS FOR MACHINE H
 January, 1958

No samples submitted.

^a With minimum tension.
^b With tension of 1 lb./in.
^c With tension of 1/2 lb./in.
^d With tension of 1-1/2 lb./in.

TABLE XI
SUMMARY OF TEST RESULTS FOR MACHINE I
January, 1958

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.	
I-1	12-17-57	12-23-57	336	26.5	12.4	11.0	11.8	40.2	36.0	37.1	40.4	35.0	36.8	Satisfactory at 600 f.p.m. ^a
I-2	12-19-57	12-26-57	337	26.7	12.0	11.0	11.5	41.4	34.2	37.1	40.0	36.6	37.6	Satisfactory at 600 f.p.m. ^a
I-3	1-3-58	1-6-58	338	27.4	12.0	10.8	11.3	45.0	40.8	42.1	43.8	40.6	42.2	Satisfactory at 600 f.p.m. ^a
I-4	1-7-58	1-10-58	339	25.9	11.8	10.2	11.0	39.6	37.8	38.6	39.2	37.4	38.3	Satisfactory at 600 f.p.m. ^b
I-5	1-10-58	1-14-58	340	26.7	11.2	10.8	11.0	35.0	34.8	37.9	40.0	37.6	38.8	Satisfactory at 600 f.p.m. ^c
I-6	1-14-58	1-20-58	341	27.1	12.0	11.0	11.4	38.4	35.4	37.0	41.0	38.0	39.8	Satisfactory at 600 f.p.m. ^a
I-7	1-17-58	1-20-58	342	27.1	11.8	10.6	11.1	39.6	36.6	38.3	41.4	38.4	40.2	Satisfactory at 600 f.p.m. ^c
I-8	1-21-58	1-23-58	343	26.3	11.3	10.5	10.8	39.0	34.8	36.7	40.2	37.6	39.0	Satisfactory at 525 f.p.m. ^a
Current Machine Average				26.7			11.2			38.1				39.1
Cumulative Machine Average				26.7			11.0			38.6				39.0
Machine Factor, %				100.0			102.3			98.7				100.2
Machine Index, %				99.2			108.8			108.0				107.7

^a With minimum tension.
^b With tension of 1 lb./in.
^c With tension of 1/2 lb./in.

TABLE XII
 SUMMARY OF TEST RESULTS FOR MACHINE J
 January, 1958

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Calliper, 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	1-3-58	1-13-58	52	26.1	10.5	9.8	10.1	33.6	31.8	32.8	33.6	31.6	32.7	Satisfactory at 600 f.p.m. ^a	
J-2	1-4-58	1-13-58	53	25.6	9.7	9.0	9.3	33.6	29.4	31.8	37.6	34.6	35.9	Satisfactory at 600 f.p.m. ^a	
J-3	1-8-58	1-14-58	54	25.2	9.2	8.8	9.0	35.4	30.6	33.5	35.8	32.6	33.9	Satisfactory at 600 f.p.m. ^a	
J-4	1-8-58	1-14-58	55	24.6	10.0	9.2	9.6	31.3	30.6	31.2	33.8	31.6	32.5	Satisfactory at 600 f.p.m. ^a	
J-5	1-12-58	1-20-58	56	25.8	10.0	9.4	9.8	33.6	28.8	32.3	35.8	30.8	32.9	Satisfactory at 600 f.p.m. ^a	
J-6	1-13-58	1-20-58	57	25.8	10.7	10.0	10.4	30.0	27.6	28.8	31.0	30.2	30.5	Satisfactory at 600 f.p.m. ^b	
Current Machine Average				25.5			9.7			31.7				33.1	
Cumulative Machine Average				26.7			10.0			35.8					36.9
Machine Factor, %				95.5			96.7			88.6				89.6	
Machine Index, %				94.7			93.8			89.9				91.2	

^a With tension of 1-1/2 lb./in.
^b With tension of 1/2 lb./in.

TABLE XIII
SUMMARY OF TEST RESULTS FOR MACHINE K
January, 1958

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.	
K-1	12-1-57	12-24-57	--	26.4	10.2	9.3	10.0	32.4	30.6	31.4	34.0	31.0	32.6	Satisfactory at 600 f.p.m. ^a
K-2	12-2-57	12-24-57	--	25.9	10.0	9.7	9.9	34.8	31.2	32.6	34.4	33.0	34.0	Satisfactory at 600 f.p.m. ^b
K-3	12-5-57	12-31-57	--	25.7	10.3	9.8	10.1	33.6	30.6	32.5	31.6	30.0	30.6	Satisfactory at 600 f.p.m. ^a
K-4	12-8-57	12-31-57	--	25.8	9.8	9.3	9.7	36.6	30.6	33.0	34.4	31.0	33.2	Satisfactory at 600 f.p.m. ^a
K-5	12-18-57	1-7-58	--	26.6	10.2	9.8	9.9	35.4	33.6	34.4	35.8	33.2	34.5	Satisfactory at 600 f.p.m. ^a
K-6	12-21-57	1-7-58	--	25.6	10.5	9.8	10.1	28.8	26.4	28.1	33.0	28.4	31.2	Satisfactory at 600 f.p.m. ^a
K-7	12-22-57	1-13-58	--	26.5	10.2	10.0	10.1	32.4	31.2	31.7	33.2	30.0	31.8	Satisfactory at 600 f.p.m. ^b
K-8	12-27-57	1-13-58	--	26.6	10.2	9.7	10.0	31.2	28.2	30.0	36.0	34.4	35.2	Satisfactory at 600 f.p.m. ^b
K-9	12-28-57	1-16-58	--	26.5	10.2	9.8	10.0	37.2	33.0	34.6	34.8	33.6	34.1	Satisfactory at 600 f.p.m. ^c
K-10	12-29-57	1-16-58	--	26.0	10.0	9.3	9.7	35.4	30.6	33.7	36.8	34.8	35.8	Satisfactory at 600 f.p.m. ^c
Current Machine Average				26.2			9.9			32.2			33.3	
Cumulative Machine Average				26.5			10.0			33.8			34.9	
Machine Factor, %				98.8			99.5			95.2			95.6	
Machine Index, %				97.1			96.3			91.3			91.9	

^a With tension of 1 lb./in.
^b With tension of 1-1/2 lb./in.
^c With tension of 1/2 lb./in.

TABLE XIV
 SUMMARY OF TEST RESULTS FOR MACHINE L
 January, 1958

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	12-11-57	12-19-57	--	26.7	11.2	10.4	10.8	34.2	32.4	33.1	33.6	31.8	32.5	Satisfactory at 600 f.p.m. ^a
L-2	12-14-57	12-19-57	--	26.0	10.4	10.0	10.1	34.8	31.2	33.5	34.2	31.8	33.0	Satisfactory at 600 f.p.m. ^a
L-3	12-18-57	12-30-57	--	26.9	10.9	10.4	10.7	42.6	36.0	39.1	37.4	34.6	35.8	Satisfactory at 600 f.p.m. ^a
L-4	12-21-57	12-30-57	--	26.6	11.3	10.5	11.0	37.8	32.4	35.8	34.0	31.0	32.3	Satisfactory at 600 f.p.m. ^a
L-5	1-8-58	1-15-58	--	26.8	10.8	9.4	10.3	37.8	32.4	33.8	35.4	32.6	33.7	Satisfactory at 600 f.p.m. ^a
L-6	1-10-58	1-15-58	--	26.5	10.7	9.9	10.4	39.0	32.4	36.4	38.0	35.6	36.3	Satisfactory at 600 f.p.m. ^a
L-7	1-15-58	1-23-58	--	26.7	10.9	10.2	10.7	36.0	30.0	33.6	34.6	32.6	34.0	Satisfactory at 600 f.p.m. ^b
Current Machine Average				26.6	10.6			35.0			33.9			
Cumulative Machine Average				26.2	10.4			34.5			34.3			
Machine Factor, %				101.5	101.6			101.7			98.9			
Machine Index, %				98.7	102.2			99.3			93.6			

^a With minimum tension.
^b With tension of 1/2 lb./in.

TABLE XV
SUMMARY OF TEST RESULTS FOR MACHINE M
January, 1958

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.	
N-1	12-18-57	12-23-57	147	27.3	11.6	10.6	10.9	37.8	33.0	36.2	38.8	34.0	37.1	Satisfactory at 600 f.p.m. ^b Satisfactory at 600 f.p.m. ^c
N-2	1-14-58	1-16-58	98	26.8	10.1	9.9	10.0	36.0	33.6	34.4	34.8	32.4	33.2	
Current Machine Average				27.0			10.5		35.3				35.2	
Cumulative Machine Average				27.1			10.6		35.3				36.0	
Machine Factor, %				99.6			98.6		100.0				97.7	
Machine Index, %				100.4			101.3		100.2				96.9	

TABLE XVI
SUMMARY OF TEST RESULTS FOR MACHINE N
January, 1958

N-1	12-18-57	12-26-57	196	27.1	10.6	9.5	10.1	39.0	34.2	35.8	41.4	35.4	38.6	Satisfactory at 600 f.p.m. ^a
N-2	1- 1-58	1- 7-58	197	26.9	10.2	9.8	10.0	40.2	36.0	37.3	41.4	36.0	38.9	Satisfactory at 600 f.p.m. ^a
N-3	1- 8-58	1-13-58	198	26.7	10.8	9.9	10.3	37.8	32.4	34.2	37.0	34.0	35.6	Satisfactory at 600 f.p.m. ^b
N-4	1-10-58	1-17-58	199	27.6	11.3	10.1	10.8	40.8	36.0	38.0	40.4	35.8	38.3	Satisfactory at 600 f.p.m. ^a
Current Machine Average				27.1			10.3		36.3				37.8	
Cumulative Machine Average				27.1			10.1		39.4				40.4	
Machine Factor, %				100.0			101.8		92.1				93.7	
Machine Index, %				100.5			99.6		103.0				104.3	

a With minimum tension.
b With tension of 1/2 lb./in.
c With tension of 1-1/2 lb./in.

TABLE XVII

SUMMARY OF TEST RESULTS FOR MACHINE O
January, 1958

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.				
0-1	12-19-57	12-30-57	--	26.0	10.2	9.6	10.0	39.6	31.8	35.2	34.6	33.4	34.2	Satisfactory at 600 f.p.m. ^a
0-2	12-23-57	12-30-57	--	26.1	10.6	10.0	10.2	37.2	34.2	36.1	34.4	32.2	33.6	Satisfactory at 600 f.p.m. ^b
0-3	12-30-57	1-6-58	--	26.1	10.7	10.1	10.4	34.8	31.8	33.2	34.0	32.4	33.2	Satisfactory at 600 f.p.m. ^b
0-4	1-6-58	1-9-58	--	25.8	10.4	9.8	10.1	31.8	30.0	30.8	33.2	31.4	32.5	Satisfactory at 600 f.p.m. ^c
0-5	1-16-58	1-23-58	--	26.0	10.4	9.7	9.9	35.4	33.6	34.3	37.6	36.2	37.0	Satisfactory at 600 f.p.m. ^a
Current Machine Average				26.0	10.1		10.1			33.9				34.1
Cumulative Machine Average				26.1	10.1		10.1			34.1				35.3
Machine Factor, %				99.5			100.0			99.5				96.5
Machine Index, %				96.5			98.0			96.2				94.0

TABLE XVIII

SUMMARY OF TEST RESULTS FOR MACHINE P
January, 1958

No samples submitted.

^a With minimum tension.
^b With tension of 1/2 lb./in.
^c With tension of 1-1/2 lb./in.

TABLE XIX
 SUMMARY OF TEST RESULTS FOR MACHINE Q
 January, 1958

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	12-10-57	12-26-57	163	27.4	11.0	9.9	10.7	36.0	31.2	32.4	34.2	32.8	33.6	Satisfactory at 600 f.p.m. ^a	
Q-2	12-14-57	12-26-57	164	28.2	11.0	10.8	10.9	39.6	35.4	37.3	38.6	36.2	37.3	Satisfactory at 600 f.p.m. ^b	
Q-3	12-26-57	1-7-58	165	29.5	12.5	11.3	11.9	39.0	33.0	36.4	35.6	33.4	34.4	Satisfactory at 600 f.p.m. ^a	
Q-4	12-28-57	1-7-58	166	26.4	11.0	10.3	10.7	31.8	27.6	30.0	34.2	32.2	33.1	Satisfactory at 600 f.p.m. ^b	
Q-5	12-30-57	1-7-58	167	27.1	11.2	10.0	10.6	37.2	34.2	36.0	36.8	34.4	35.7	Satisfactory at 600 f.p.m. ^a	
Q-6	1-11-58	1-20-58	168	26.9	11.8	11.0	11.5	31.2	26.4	29.0	32.4	28.0	29.4	Satisfactory at 600 f.p.m. ^b	
Current Machine Average				27.6			11.1			33.5				33.9	
Cumulative Machine Average				27.2			10.6			35.4				36.0	
Machine Factor, %				101.5			104.1			94.8				94.2	
Machine Index, %				102.3			107.0			95.0				93.6	

^a With tension of 1-1/2 lb./in.

^b With tension of 1 lb./in.

TABLE XX
 SUMMARY OF TEST RESULTS FOR MACHINE R
 January, 1958

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.
R-1	12-18-57	12-23-57	146	27.3	11.6	10.6	11.0	36.0	31.8	33.8	36.8	33.4	35.1	Satisfactory at 600 f.p.m. ^a
R-2	1-14-58	1-16-58	148	26.8	10.8	10.2	10.6	39.0	32.4	37.1	41.2	37.6	39.0	Satisfactory at 600 f.p.m. ^b
R-3	1-16-58	1-20-58	149	26.9	10.3	10.0	10.1	36.0	34.2	35.4	36.8	35.0	35.9	Satisfactory at 600 f.p.m. ^b
R-4	1-20-58	1-23-58	150	27.8	10.8	10.5	10.7	37.2	34.2	35.6	39.2	36.4	37.6	Satisfactory at 600 f.p.m. ^a
Current Machine Average				27.2	10.6					35.5			36.9	
Cumulative Machine Average				26.8	10.4					35.2			35.8	
Machine Factor, %				101.5	102.1					100.7			102.9	
Machine Index, %				100.9	102.6					100.6			101.7	

TABLE XXI
 SUMMARY OF TEST RESULTS FOR MACHINE S
 January, 1958

No samples submitted.

^a With minimum tension.
^b With tension of 1 lb./in.

TABLE XXII
SUMMARY OF TEST RESULTS FOR MACHINE T
January, 1958

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.	Max.	Min.	Max.	Min.		Av.		
T-1	12-16-57	12-23-57	512	28.6	12.0	10.8	11.6	36.0	32.4	33.7	39.4	33.4	37.2	Satisfactory at 600 f.p.m. ^a
T-2	12-19-57	12-26-57	597	26.8	11.3	10.0	11.0	36.6	34.2	35.3	38.8	35.8	37.6	Satisfactory at 400 f.p.m. ^b
T-3	12-19-57	12-26-57	600	26.8	10.8	10.1	10.4	36.0	33.6	34.6	38.4	35.0	36.6	Satisfactory at 400 f.p.m. ^b
T-4	1-2-58	1-16-58	35	25.8	12.0	11.0	11.5	35.4	31.8	33.2	31.4	30.6	31.0	Satisfactory at 600 f.p.m. ^b
T-5	1-9-58	1-23-58	--	26.3	11.8	11.3	11.5	37.2	33.6	35.5	33.2	31.0	32.1	Satisfactory at 600 f.p.m. ^a
Current Machine Average				26.9			11.2			34.5			34.9	
Cumulative Machine Average				27.1			11.5			36.2			37.3	
Machine Factor, %				99.0			97.5			95.2			93.5	
Machine Index, %				99.7			108.4			97.7			96.3	

TABLE XXIII
SUMMARY OF TEST RESULTS FOR MACHINE U
January, 1958

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.	Max.	Min.	Max.	Min.		Av.		
U-1	12-17-57	12-23-57	3	28.2	11.5	10.9	11.0	31.8	28.2	30.2	36.0	32.2	34.0	Satisfactory at 600 f.p.m. ^c
U-2	12-18-57	12-23-57	4	27.9	11.3	10.8	11.1	34.8	33.0	34.3	32.4	31.8	32.2	Satisfactory at 600 f.p.m. ^a
Current Machine Average				28.0			11.1			32.3			33.1	
Cumulative Machine Average				--			--			--			--	
Machine Factor, %				--			--			--			--	
Machine Index, %				104.0			107.0			91.5			91.3	

^a With tension of 1/2 lb./in.
^b With minimum tension.
^c With tension of 1-1/2 lb./in.

TABLE XXIV
 SUMMARY OF TEST RESULTS FOR MACHINE V
 January, 1958

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.	Max.	Min.	Max.	Min.		Av.	Av.	
V-1	12-31-57	1-9-58	5	27.9	10.9	10.0	10.6	34.2	31.2	32.6	35.4	33.0	34.4	Satisfactory at 600 f.p.m. ^a
V-2	1-1-58	1-9-58	6	26.5	10.0	9.8	9.9	30.0	28.2	28.8	31.8	29.6	30.9	Satisfactory at 600 f.p.m. ^b
Current Machine Average				27.2			10.2			30.7			32.6	
Cumulative Machine Average				--			--			--			--	
Machine Factor, %				--			--			--			--	
Machine Index, %				101.0			99.1			87.1			89.9	

TABLE XXV
 SUMMARY OF TEST RESULTS FOR MACHINE W
 January, 1958

No samples submitted.

^a With tension of 1-1/2 lb./in.
^b With tension of 1/2 lb./in.

TABLE XXVI
SUMMARY OF TEST RESULTS FOR MACHINE X
January, 1958

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.
X-1	1-14-58	1-20-58	7	28.3	11.2	10.8	11.0	36.6	33.6	35.8	36.8	32.6	34.6	Satisfactory at 600 f.p.m. ^a
X-2	1-14-58	1-20-58	8	27.6	11.0	10.5	10.7	36.6	30.6	32.8	36.0	30.8	33.6	Satisfactory at 600 f.p.m. ^a
Current Machine Average				27.9	10.8		10.8		34.3				34.1	
Cumulative Machine Average				--	--		--		--				--	
Machine Factor, %				--	--		--		--				94.1	
Machine Index, %				103.6	105.0		97.1							

TABLE XXVII
SUMMARY OF TEST RESULTS FOR MACHINE Y
January, 1958

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.
Y-1	1-15-58	1-20-58	9	28.0	10.9	10.0	10.4	33.0	30.0	31.8	36.6	30.8	33.9	Satisfactory at 600 f.p.m. ^b
Y-2	1-15-58	1-20-58	10	28.0	10.8	10.2	10.5	33.0	30.0	31.8	36.8	32.4	34.0	Satisfactory at 600 f.p.m. ^a
Current Machine Average				28.0	10.5		10.5		31.8				34.0	
Cumulative Machine Average				--	--		--		--				--	
Machine Factor, %				--	--		--		--				93.6	
Machine Index, %				104.0	101.4		90.1							

^a With tension of 1 lb./in.

^b With tension of 1-1/2 lb./in.