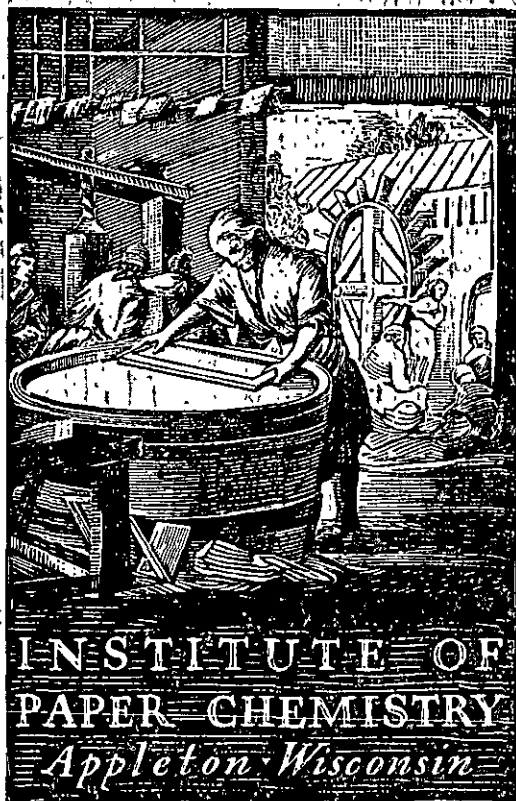


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**CONTINUOUS EVALUATION OF  
CORRUGATING MEDIUM**  
✓ Project 1108-17  
Progress Report Twenty-six  
to  
**FOURDRINER KRAFT BOARD INSTITUTE, INC.**  
January 1, 1958

THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

CONTINUOUS EVALUATION OF CORRUGATING MEDIUM

Project 1108-17

Progress Report Twenty-six

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FOURDRINIER KRAFT BOARD INSTITUTE, INC.

January 1, 1958

# THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

## 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 December, seventy-three different sample lots of corrugating medium, submitted from the production of eighteen 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	4
B	7
C	5
D	6
E	0
F	4
G	2
H	6
I	6
J	0
K	0
L	3
M	6
N	1
O	1
P	5
Q	6
R	1
S	6
T	2
U	2
Total	<u>73</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.

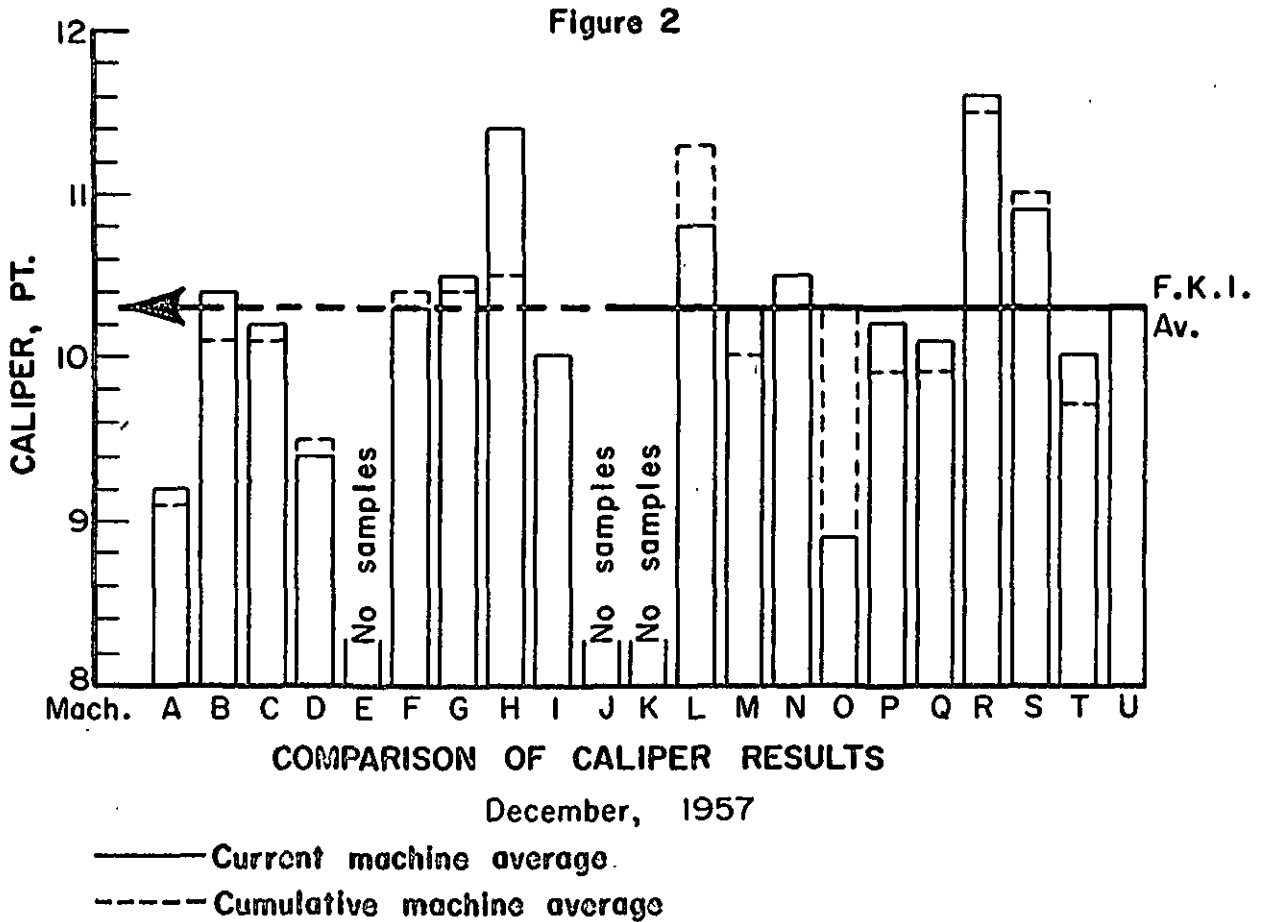
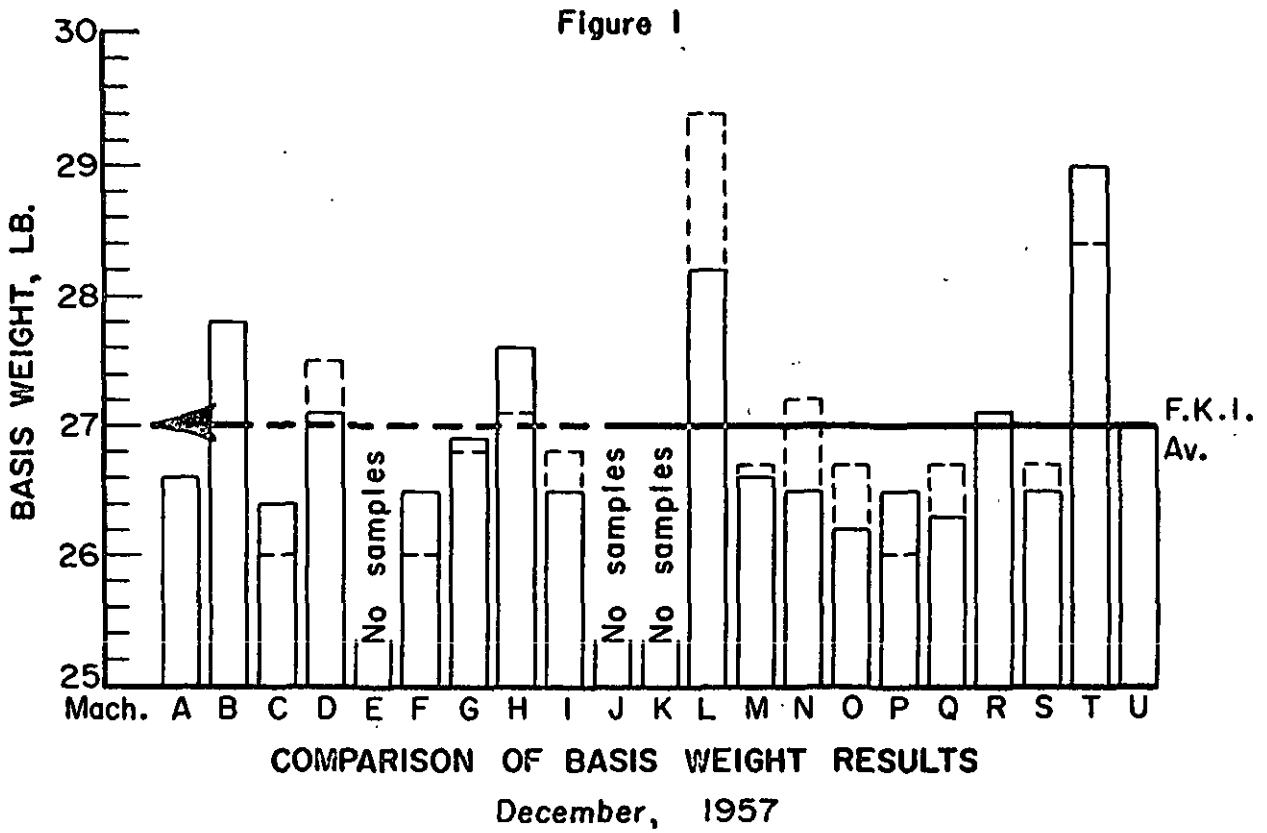
Flat crush was determined on the board obtained at the highest speed with minimum tension. In addition to information about quality, these results will provide data which may be useful in studying the relationship between Concora flat crush and combined board flat crush for each participant's medium.

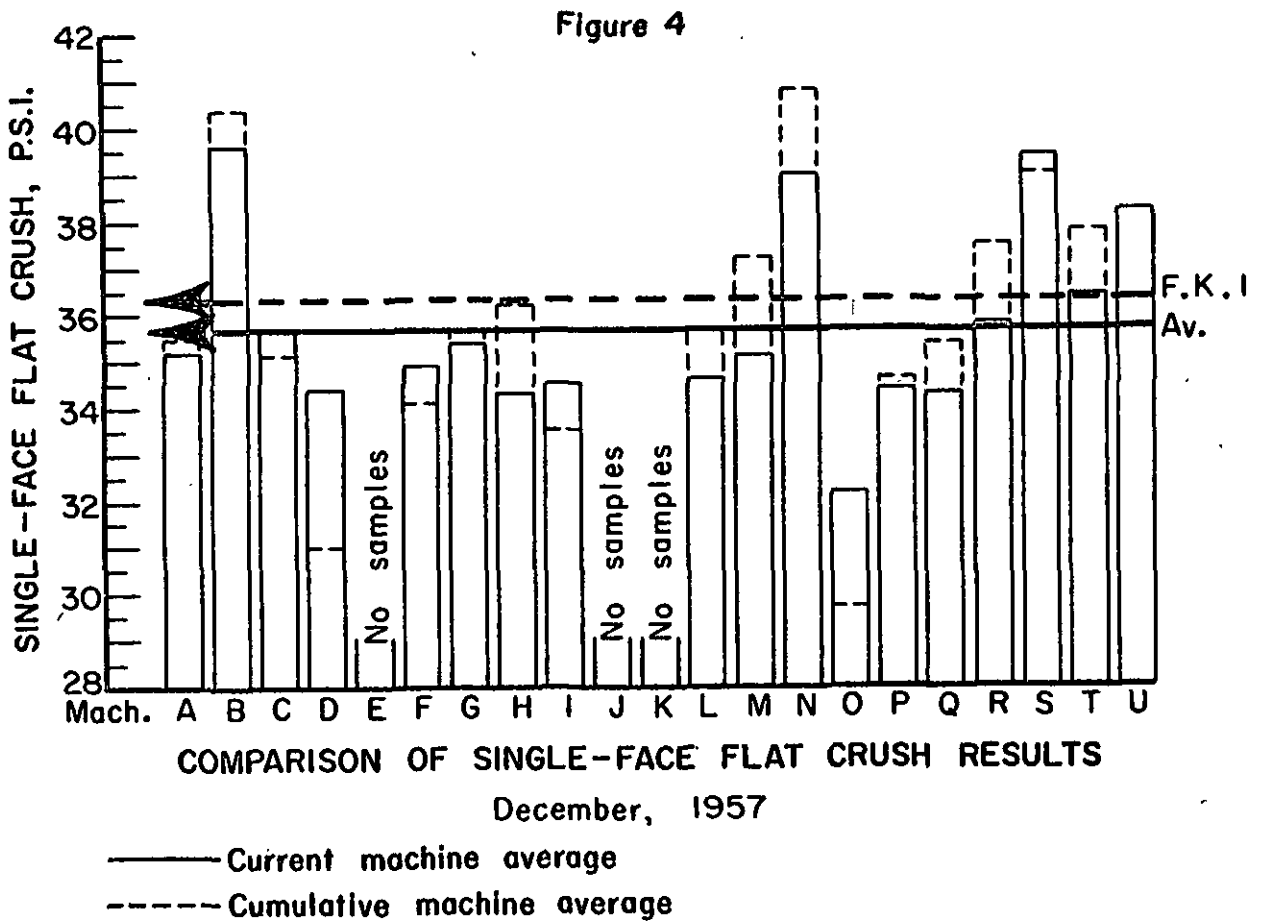
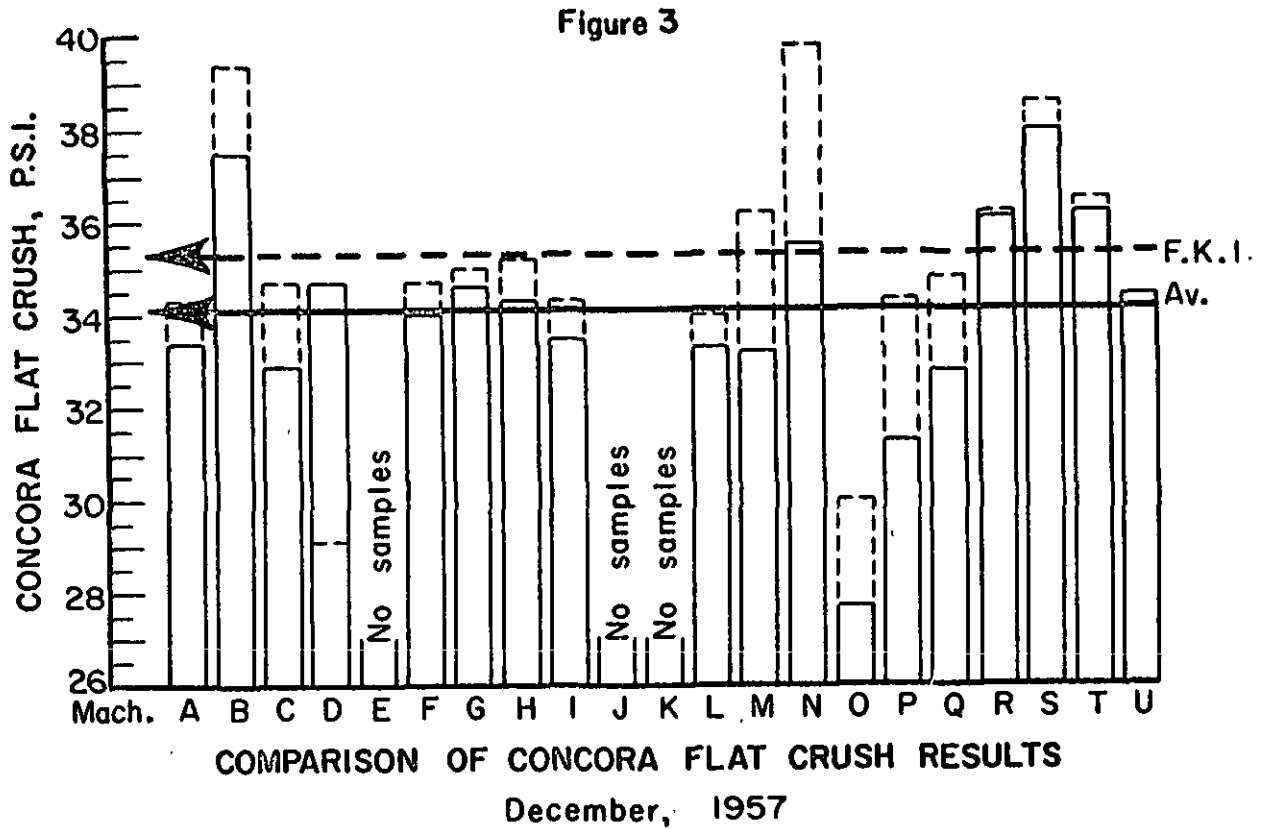
As requested by members of the F.K.B.I., the Concora medium test results are calculated on the basis of pounds of load per unit area rather than on the basis of the formula suggested by the Concora manufacturer and are reported as Concora flat crush test results. In Progress Reports One and Two, the 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. 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  
 December, 1957

Machine Code	Basis Weight, lb.	Caliper, points	Concora Flat Crush, p.s.i.	Single-Face Flat Crush, p.s.i.
A	26.6	9.2	33.4	35.2
B	27.8	10.4	37.5	39.6
C	26.4	10.2	32.9	35.7
D	27.1	9.4	34.7	34.4
E	No samples submitted.			
F	26.5	10.3	34.0	34.9
G	26.9	10.5	34.6	35.4
H	27.6	11.4	34.3	34.3
I	26.5	10.0	33.5	34.5
J	No samples submitted.			
K	No samples submitted.			
L	28.2	10.8	33.3	34.6
M	26.6	10.3	33.2	35.1
N	26.5	10.5	35.5	39.0
O	26.2	8.9	27.7	32.2
P	26.5	10.2	31.3	34.4
Q	26.3	10.1	32.8	34.3
R	27.1	11.6	36.1	35.8
S	26.5	10.9	38.0	39.4
T	29.0	10.0	36.2	36.4
U	27.0	10.3	34.4	38.2
Current F.K.I. Average	27.0	10.3	34.1	35.7
Cumulative F.K.I. Average	27.0	10.3	35.3	36.3
F.K.I. Index, %	100.0	100.0	96.6	98.6





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 XXIII for machines A through U, 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 XXIII 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 26.2 lb. for Machine O to a high of 29.0 lb. for Machine T. The average basis weight for the eighteen 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 100.0%. The average results for all machines satisfy the requirements of Rule 41.

Caliper results varied from a low value of 8.9 points for Machine O to a high value of 11.6 points for Machine R. 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 except O meet the Rule 41 specification.

Concora flat crush test results ranged from a minimum of 27.7 p.s.i. for Machine O to a maximum of 38.0 p.s.i. for Machine S. The current F.K.I. average was 34.1 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 96.6%.

Machine B had the highest average single-face flat crush of 39.6 p.s.i., and Machine O had the lowest, 32.2 p.s.i. The current F.K.I. average for flat crush was 35.7 p.s.i., whereas the cumulative F.K.I. average was 36.3 p.s.i., giving an F.K.I. index of 98.6%.

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 and the current F.K.I. averages for Concora flat crush and single-face flat crush were slightly lower than their cumulative F.K.I. averages.

TABLE III  
SUMMARY OF TEST RESULTS FOR MACHINE A  
December, 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.
A-1	11-21-57	11-29-57	--	27.5	9.7	8.8	9.1	35.4	31.2	33.1	36.8	34.8	35.8	Satisfactory at 600 f.p.m. <sup>a</sup>
A-2	12-4-57	12-11-57	--	26.0	9.5	8.9	9.2	33.6	29.4	31.9	36.2	32.4	34.0	Satisfactory at 600 f.p.m. <sup>a</sup>
A-3	12-7-57	12-16-57	145	26.7	10.6	9.3	9.8	34.8	32.4	34.1	36.2	33.4	35.4	Satisfactory at 600 f.p.m. <sup>b</sup>
A-4	12-10-57	12-16-57	146	26.3	9.1	8.8	8.9	36.6	33.6	34.7	36.4	34.0	35.6	Satisfactory at 600 f.p.m. <sup>a</sup>
Current Machine Average				26.6		9.2		33.4		33.4		35.2		
Cumulative Machine Average				26.6		9.1		34.3		34.3		35.5		
Machine Factor, %				100.0		101.5		97.5		97.5		99.0		
Machine Index, %				98.7		89.4		94.8		94.8		97.1		

TABLE IV  
SUMMARY OF TEST RESULTS FOR MACHINE B  
December, 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.
B-1	11-21-57	11-29-57	188	27.6	10.7	10.0	10.2	39.6	37.2	38.4	43.8	42.4	42.9	Satisfactory at 600 f.p.m. <sup>b</sup>
B-2	11-25-57	12-2-57	190	27.6	10.6	10.0	10.2	36.6	33.6	35.4	39.2	36.8	38.2	Satisfactory at 600 f.p.m. <sup>b</sup>
B-3	11-25-57	12-2-57	191	27.6	10.7	9.9	10.2	36.6	32.4	34.2	37.6	36.4	37.0	Satisfactory at 600 f.p.m. <sup>c</sup>
B-4	12-4-57	12-11-57	192	28.2	11.3	10.6	10.9	40.8	36.6	38.8	44.2	38.2	40.8	Satisfactory at 600 f.p.m. <sup>c</sup>
B-5	12-7-57	12-17-57	193	27.6	11.0	10.0	10.7	40.8	37.8	38.4	42.0	38.2	39.6	Satisfactory at 600 f.p.m. <sup>c</sup>
B-6	12-10-57	12-17-57	194	28.4	11.1	10.2	10.7	43.8	36.6	40.9	41.8	38.8	40.2	Satisfactory at 600 f.p.m. <sup>b</sup>
B-7	12-12-57	12-17-57	195	27.4	10.2	9.3	9.9	38.4	34.8	36.6	40.6	37.4	38.8	Satisfactory at 600 f.p.m. <sup>c</sup>
Current Machine Average				27.8		10.4		37.5		37.5		39.6		
Cumulative Machine Average				27.0		10.1		39.4		39.4		40.4		
Machine Factor, %				102.7		103.0		95.2		95.2		98.1		
Machine Index, %				103.0		100.3		106.3		106.3		109.3		

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

TABLE V  
SUMMARY OF TEST RESULTS FOR MACHINE C  
December, 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.	Max.	Min.	Max.	Min.		Av.	Av.	
C-1	11-21-57	11-29-57	--	26.0	10.0	9.7	9.9	34.2	31.2	32.9	36.4	32.4	34.7	Satisfactory at 600 f.p.m. <sup>a</sup>
C-2	11-29-57	12-4-57	--	26.7	10.6	10.0	10.4	35.4	30.6	33.1	38.0	35.4	36.1	Satisfactory at 600 f.p.m. <sup>a</sup>
C-3	12-2-57	12-4-57	--	26.9	10.6	10.0	10.2	32.4	29.4	31.2	36.6	33.4	34.9	Satisfactory at 600 f.p.m. <sup>a</sup>
C-4	12-5-57	12-12-57	--	26.0	10.7	10.0	10.2	34.2	31.2	32.8	37.8	35.0	35.9	Satisfactory at 600 f.p.m. <sup>b</sup>
C-5	12-9-57	12-12-57	--	26.3	10.4	9.8	10.1	36.6	32.4	34.7	37.8	35.6	36.9	Satisfactory at 600 f.p.m. <sup>b</sup>
Current Machine Average				26.4		10.2		32.9		32.9		35.7		
Cumulative Machine Average				26.0		10.1		34.7		34.7		35.1		
Machine Factor, %				101.6		101.0		94.9		94.9		101.6		
Machine Index, %				97.8		98.3		93.3		93.3		98.4		

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

D-1	11-26-57	12-9-57	45	26.6	9.9	8.8	9.2	37.2	33.6	35.2	38.4	34.2	35.9	Satisfactory at 600 f.p.m. <sup>c</sup>
D-2	11-26-57	12-9-57	46	26.8	9.9	8.7	9.3	37.2	32.4	34.3	37.4	35.2	36.6	Satisfactory at 600 f.p.m. <sup>c</sup>
D-3	11-26-57	12-9-57	47	26.5	9.8	8.9	9.2	37.2	34.8	35.9	39.4	33.6	36.5	Satisfactory at 600 f.p.m. <sup>d</sup>
D-4	12-6-57	12-16-57	48	27.9	10.2	9.5	9.8	38.4	30.6	36.0	33.6	32.4	33.0	Satisfactory at 600 f.p.m. <sup>b</sup>
D-5	12-6-57	12-16-57	49	27.4	10.0	9.0	9.5	36.0	32.4	34.0	33.6	32.0	32.9	Satisfactory at 600 f.p.m. <sup>b</sup>
D-6	12-6-57	12-16-57	50	27.6	10.0	9.2	9.7	36.6	30.6	32.9	32.6	30.6	31.4	Satisfactory at 600 f.p.m. <sup>a</sup>
Current Machine Average				27.1		9.4		34.7		34.7		34.4		
Cumulative Machine Average				27.5		9.5		29.1		29.1		31.0		
Machine Factor, %				98.7		99.1		119.4		119.4		111.0		
Machine Index, %				100.5		91.4		98.3		98.3		94.8		

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

TABLE VII  
 SUMMARY OF TEST RESULTS FOR MACHINE E  
 December, 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.	

No samples submitted.

TABLE VIII  
 SUMMARY OF TEST RESULTS FOR MACHINE F  
 December, 1957

F-1	11-20-57	11-29-57	--	26.9	10.7	9.7	10.1	34.8	30.0	32.9	36.4	33.0	34.4	Satisfactory at 600 f.p.m. <sup>a</sup>	
F-2	11-27-57	12-4-57	--	26.4	10.4	9.9	10.3	36.0	31.2	34.0	39.0	35.8	37.5	Satisfactory at 600 f.p.m. <sup>b</sup>	
F-3	12-4-57	12-12-57	--	26.2	10.8	9.9	10.4	36.0	31.8	33.2	33.2	29.6	31.2	Satisfactory at 600 f.p.m. <sup>b</sup>	
F-4	12-7-57	12-12-57	--	26.5	10.8	10.2	10.5	37.2	35.4	36.1	39.4	35.0	36.5	Satisfactory at 600 f.p.m. <sup>c</sup>	
Current Machine Average				26.5	10.3		10.3			34.0			34.9		
Cumulative Machine Average				26.0	10.4		10.4			34.7			34.1		
Machine Factor, %				101.8			99.2			98.2			102.5		
Machine Index, %				98.3			99.9			96.5			96.2		

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

<sup>b</sup> With minimum tension

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

**TABLE IX**  
**SUMMARY OF TEST RESULTS FOR MACHINE G**  
December, 1957

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points		Concra Flat Crush, P.s.i.		Single-Face Flat Crush, P.s.i.		Runability			
					Max.	Min.	Max.	Min.	Max.	Min.		Av.	Av.	
G-1	11-29-57	12-2-57	146	26.5	10.5	10.0	10.3	34.2	31.2	32.8	35.4	33.4	34.2	Satisfactory at 600 f.p.m. <sup>a</sup>
G-2	12-11-57	12-16-57	145	27.2	11.1	10.6	10.8	38.4	35.4	36.4	38.0	35.8	36.6	Satisfactory at 600 f.p.m. <sup>b</sup>
Current Machine Average				26.9			10.5			34.6			35.4	
Cumulative Machine Average				26.8			10.4			35.0			35.7	
Machine Factor, %				100.4			101.3			98.7			99.2	
Machine Index, %				99.6			102.0			97.9			97.7	

**TABLE X**  
**SUMMARY OF TEST RESULTS FOR MACHINE H**  
December, 1957

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points		Concra Flat Crush, P.s.i.		Single-Face Flat Crush, P.s.i.		Runability			
					Max.	Min.	Max.	Min.	Max.	Min.		Av.	Av.	
H-1	11-14-57	11-29-57	157	27.3	12.0	11.0	11.6	33.6	29.4	31.7	36.4	34.0	35.0	Satisfactory at 600 f.p.m. <sup>a</sup>
H-2	11-19-57	11-29-57	158	28.9	12.9	12.1	12.5	36.6	29.4	34.7	35.6	33.4	34.8	Satisfactory at 600 f.p.m. <sup>a</sup>
H-3	11-21-57	12-2-57	159	27.6	12.2	11.4	11.8	34.2	31.2	32.0	29.6	26.4	28.4	Satisfactory at 600 f.p.m. <sup>b</sup>
H-4	11-23-57	12-17-57	160	26.8	11.9	11.1	11.7	39.0	30.0	35.0	36.0	33.4	34.8	Satisfactory at 600 f.p.m. <sup>a</sup>
H-5	11-27-57	12-17-57	161	28.0	11.6	10.8	11.2	39.0	34.2	36.0	40.0	33.8	37.2	Satisfactory at 600 f.p.m. <sup>a</sup>
H-6	12-3-57	12-13-57	--	26.8	10.1	8.9	9.5	37.2	35.4	36.1	37.6	34.0	35.5	Satisfactory at 600 f.p.m. <sup>b</sup>
Current Machine Average				27.6			11.4			34.3			34.3	
Cumulative Machine Average				27.1			10.5			35.2			36.2	
Machine Factor, %				101.6			108.0			97.2			94.7	
Machine Index, %				102.2			110.0			97.1			94.5	

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

TABLE XI  
SUMMARY OF TEST RESULTS FOR MACHINE I  
December, 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.
I-1	11-9-57	12-3-57	--	26.8	10.2	9.9	10.1	30.6	27.0	29.0	34.0	30.4	32.0	Satisfactory at 600 f.p.m. <sup>a</sup>
I-2	11-11-57	12-3-57	--	26.9	10.6	9.8	10.1	34.2	29.4	31.2	38.2	34.6	36.0	Satisfactory at 600 f.p.m. <sup>b</sup>
I-3	11-18-57	12-9-57	--	27.1	10.3	10.0	10.1	39.0	33.0	36.1	36.6	34.2	35.4	Satisfactory at 600 f.p.m. <sup>b</sup>
I-4	11-20-57	12-9-57	--	25.7	10.0	9.4	9.8	36.0	34.8	35.4	35.6	32.8	34.5	Satisfactory at 600 f.p.m. <sup>b</sup>
I-5	11-26-57	12-13-57	--	26.5	10.9	9.9	10.2	38.4	32.4	35.0	37.0	32.4	34.5	Satisfactory at 600 f.p.m. <sup>a</sup>
I-6	11-27-57	12-13-57	--	26.3	10.0	9.7	9.9	36.0	32.4	34.0	35.6	33.4	34.4	Satisfactory at 600 f.p.m. <sup>b</sup>
Current Machine Average				26.5			10.0			33.5			34.5	
Cumulative Machine Average				26.8			10.0			34.3			33.5	
Machine Factor, %				99.2			100.0			97.5			103.0	
Machine Index, %				98.4			97.1			94.8			95.0	

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

No samples submitted.

TABLE XIII  
SUMMARY OF TEST RESULTS FOR MACHINE K  
December, 1957

No samples submitted.

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

TABLE XIV

SUMMARY OF TEST RESULTS FOR MACHINE L  
December, 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	12-3-57	12-9-57	134	28.2	11.4	10.8	11.1	36.0	32.4	34.1	34.0	31.8	33.0	Satisfactory at 600 f.p.m. <sup>a</sup>	
L-2	12-10-57	12-16-57	135	27.9	10.8	10.0	10.5	33.6	28.8	32.2	34.6	32.2	33.3	Satisfactory at 600 f.p.m. <sup>b</sup>	
L-3	12-12-57	12-17-57	136	28.6	10.9	10.6	10.7	34.8	33.0	33.7	38.6	36.0	37.4	Satisfactory at 600 f.p.m. <sup>c</sup>	
Current Machine Average				28.2			10.8			33.3			34.6		
Cumulative Machine Average				29.4			11.3			34.0			35.7		
Machine Factor, %				95.9			95.9			98.0			96.7		
Machine Index, %				104.7			104.3			94.4			95.3		

TABLE XV

SUMMARY OF TEST RESULTS FOR MACHINE M  
December, 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.	
M-1	11-20-57	12-2-57	45	26.7	11.2	10.6	11.0	36.6	33.6	35.0	35.6	32.8	34.0	Satisfactory at 600 f.p.m. <sup>d</sup>	
M-2	11-25-57	12-2-57	46	25.8	10.4	10.0	10.1	33.0	30.6	31.8	34.4	30.0	31.7	Satisfactory at 600 f.p.m. <sup>a</sup>	
M-3	11-26-57	12-2-57	47	26.7	10.9	10.1	10.5	32.4	30.0	31.0	33.6	31.4	32.5	Satisfactory at 600 f.p.m. <sup>c</sup>	
M-4	11-26-57	12-2-57	48	26.7	10.8	10.3	10.6	30.6	29.4	30.2	35.0	30.0	32.7	Satisfactory at 600 f.p.m. <sup>b</sup>	
M-5	12-3-57	12-10-57	49	26.5	10.0	9.4	9.7	37.2	34.2	35.2	41.4	39.8	40.6	Satisfactory at 600 f.p.m. <sup>a</sup>	
M-6	12-3-57	12-10-57	50	27.1	10.0	10.0	10.0	37.8	34.8	35.8	41.0	37.8	39.0	Satisfactory at 600 f.p.m. <sup>b</sup>	
Current Machine Average				26.6			10.3			33.2			35.1		
Cumulative Machine Average				26.7			10.0			36.2			37.2		
Machine Factor, %				99.5			103.5			91.6			94.3		
Machine Index, %				98.6			99.8			93.9			96.7		

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

TABLE XVI  
 SUMMARY OF TEST RESULTS FOR MACHINE N  
 December, 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.
N-1	11-25-57	12-2-57	189	26.5	10.8	10.0	10.5	37.2	34.2	35.5	40.0	38.0	39.0	Satisfactory at 600 f.p.m. <sup>a</sup>
Current Machine Average				26.5			10.5			35.5			39.0	
Cumulative Machine Average				27.2			10.5			39.8			40.8	
Machine Factor, %				97.5			100.0			89.3			95.7	
Machine Index, %				98.4			101.2			100.6			107.7	

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

O-1	11-7-57	12-2-57	23	26.2	9.0	8.8	8.9	28.8	26.4	27.7	34.2	31.0	32.2	Satisfactory at 600 f.p.m. <sup>a</sup>
Current Machine Average				26.2			8.9			27.7			32.2	
Cumulative Machine Average				26.7			10.3			30.0			29.7	
Machine Factor, %				98.1			86.0			92.3			108.2	
Machine Index, %				97.0			86.1			78.5			88.7	

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

TABLE XVIII

SUMMARY OF TEST RESULTS FOR MACHINE P  
December, 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.
P-1	11-19-57	11-29-57	--	26.8	10.4	10.0	10.1	36.0	31.2	33.6	38.2	35.6	36.3	Satisfactory at 600 f.p.m. <sup>a</sup>
P-2	11-22-57	11-29-57	--	26.6	10.5	10.0	10.1	35.4	32.4	33.1	36.0	33.0	34.2	Satisfactory at 600 f.p.m. <sup>a</sup>
P-3	11-30-57	12-4-57	--	26.7	10.3	10.0	10.1	30.6	29.4	30.2	35.6	33.0	34.0	Satisfactory at 600 f.p.m. <sup>b</sup>
P-4	12-3-57	12-12-57	--	26.3	10.2	9.8	10.0	30.6	27.6	29.4	34.0	30.6	32.8	Satisfactory at 600 f.p.m. <sup>c</sup>
P-5	12-6-57	12-12-57	--	26.0	10.9	10.2	10.5	30.6	29.4	30.0	35.6	34.0	34.7	Satisfactory at 600 f.p.m. <sup>c</sup>
Current Machine Average				26.5			10.2			31.3			34.4	
Cumulative Machine Average				26.0			9.9			34.3			34.6	
Machine Factor, %				101.8			102.4			91.1			99.3	
Machine Index, %				98.1			98.4			88.6			94.8	

TABLE XIX

SUMMARY OF TEST RESULTS FOR MACHINE Q  
December, 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	11-10-57	12-3-57	--	26.9	10.3	9.9	10.2	34.2	31.2	32.8	35.2	33.0	34.2	Satisfactory at 600 f.p.m. <sup>b</sup>
Q-2	11-12-57	12-3-57	--	26.9	10.0	9.7	9.9	36.6	33.0	34.6	38.2	36.6	37.4	Satisfactory at 600 f.p.m. <sup>b</sup>
Q-3	11-19-57	12-9-57	--	26.4	10.6	10.0	10.2	30.0	27.0	28.6	33.8	32.0	32.7	Satisfactory at 600 f.p.m. <sup>d</sup>
Q-4	11-21-57	12-9-57	--	26.0	10.6	10.0	10.2	34.8	28.8	31.3	34.4	31.8	33.4	Satisfactory at 600 f.p.m. <sup>b</sup>
Q-5	11-24-57	12-13-57	--	25.8	10.6	10.0	10.3	36.6	32.4	33.8	34.0	31.2	32.7	Satisfactory at 600 f.p.m. <sup>d</sup>
Q-6	11-25-57	12-13-57	--	25.7	10.0	9.5	9.8	37.2	34.2	36.0	36.6	34.0	35.4	Satisfactory at 600 f.p.m. <sup>b</sup>
Current Machine Average				26.3			10.1			32.8			34.3	
Cumulative Machine Average				26.7			9.9			34.8			35.4	
Machine Factor, %				98.5			102.2			94.3			96.8	
Machine Index, %				97.5			97.7			93.0			94.6	

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

TABLE XX  
SUMMARY OF TEST RESULTS FOR MACHINE R  
December, 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.	Max.	Min.	Max.	Min.		Av.	Av.	
R-1	11-25-57	12-4-57	660	27.1	12.0	11.1	11.6	37.2	34.2	36.1	38.0	34.8	35.8	Satisfactory at 575 f.p.m. <sup>a</sup>
Current Machine Average				27.1			11.6			36.1			35.8	
Cumulative Machine Average				27.1			11.5			36.2			37.5	
Machine Factor, %				100.0			101.1			99.7			95.6	
Machine Index, %				100.4			112.2			102.3			98.9	

TABLE XXI  
SUMMARY OF TEST RESULTS FOR MACHINE S  
December, 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.	Max.	Min.	Max.	Min.		Av.	Av.	
S-1	11-26-57	11-29-57	330	26.0	10.9	10.1	10.6	37.2	34.2	35.8	40.6	37.0	38.8	Satisfactory at 600 f.p.m. <sup>a</sup>
S-2	11-29-57	12-2-57	331	26.5	11.8	10.8	11.1	37.2	33.6	35.0	37.0	34.8	36.2	Satisfactory at 600 f.p.m. <sup>b</sup>
S-3	12-3-57	12-9-57	332	26.7	11.0	10.4	10.8	45.6	38.4	41.9	43.6	39.8	41.8	Satisfactory at 600 f.p.m. <sup>a</sup>
S-4	12-6-57	12-11-57	333	26.6	11.3	10.7	10.9	39.0	35.4	37.8	42.6	37.8	40.4	Satisfactory at 600 f.p.m. <sup>a</sup>
S-5	12-10-57	12-16-57	334	26.5	11.1	10.7	10.8	42.0	36.6	39.4	41.6	38.4	39.8	Satisfactory at 600 f.p.m. <sup>b</sup>
S-6	12-13-57	12-17-57	335	26.7	12.0	10.8	11.4	42.0	36.0	38.0	40.6	38.0	39.1	Satisfactory at 600 f.p.m. <sup>a</sup>
Current Machine Average				26.5			10.9			38.0			39.4	
Cumulative Machine Average				26.7			11.0			38.6			39.0	
Machine Factor, %				99.3			99.4			98.3			101.2	
Machine Index, %				98.2			105.6			107.6			106.7	

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

TABLE XXII  
 SUMMARY OF TEST RESULTS FOR MACHINE T  
 December, 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.
T-1	11-22-57	12-2-57	116	29.1	10.7	10.0	10.3	32.4	29.4	31.4	36.6	32.4	33.8	Satisfactory at 400 f.p.m. <sup>a</sup>
T-2	12-3-57	12-16-57	117	28.9	10.0	9.3	9.8	42.6	39.6	40.9	41.4	37.4	39.0	Satisfactory at 225 f.p.m. <sup>a</sup>
Current Machine Average				29.0			10.0			36.2			36.4	
Cumulative Machine Average				28.4			9.7			36.5			37.8	
Machine Factor, %				102.2			103.2			99.0			96.5	
Machine Index, %				107.5			96.9			102.5			100.5	

TABLE XXIII  
 SUMMARY OF TEST RESULTS FOR MACHINE U  
 December, 1957

U-1	12-10-57	12-16-57	1	27.2	10.7	9.8	10.4	36.0	33.6	35.0	41.4	36.6	38.4	Satisfactory at 600 f.p.m. <sup>b</sup>
U-2	12-10-57	12-16-57	2	26.8	10.5	10.0	10.2	37.8	31.2	33.8	40.2	35.0	38.1	Satisfactory at 600 f.p.m. <sup>b</sup>
Current Machine Average				27.0			10.3			34.4			38.2	
Cumulative Machine Average				--			--			--			--	
Machine Factor, %				--			--			--			--	
Machine Index, %				100.1			99.8			97.6			105.5	

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