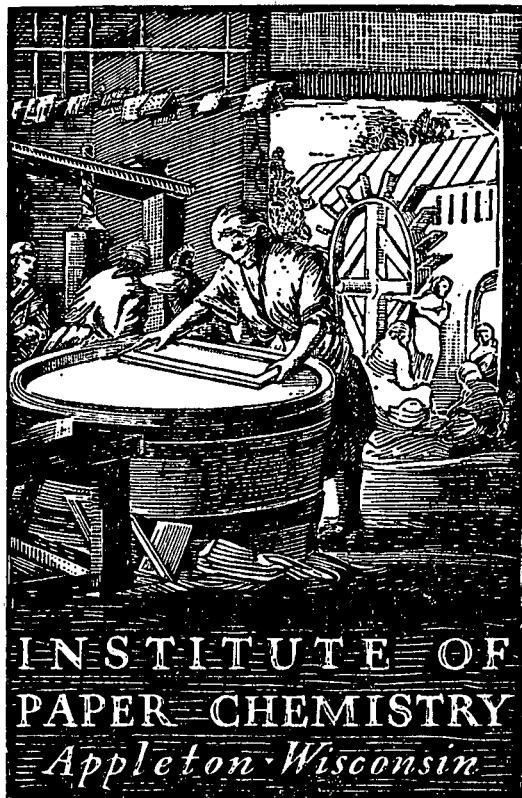


Mr. Gross



BASE-LINE
(NOVEMBER-DECEMBER, 1968)

**CONTINUOUS EVALUATION OF
CORRUGATING MEDIUM**

(Data for November and December, 1968)

Project 2694-2

Report Eleven

A Progress Report

to

FOURDRINIER KRAFT BOARD INSTITUTE, INC.

This material is intended only for the internal use of authorized
persons within Fourdrinier Kraft Board Institute member companies

January 17, 1969

BASE-LINE
(NOVEMBER-DECEMBER, 1968)

THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

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TABLE OF CONTENTS

	Page
SUMMARY	1
INTRODUCTION	4
SUMMARY OF CURRENT MACHINE AVERAGES	6
GRAPHICAL PRESENTATIONS	7
SUMMARY OF TEST RESULTS FOR INDIVIDUAL MACHINES	10
DISCUSSION OF RESULTS	29

THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

CONTINUOUS EVALUATION OF CORRUGATING MEDIUM
(Data for November and December, 1968)

SUMMARY

PART I. GENERAL

A. Participation Data:

	Previous Period	Current Period
Period	Sept.-Oct., 1968	Nov.-Dec., 1968
Number of machines	33	35
Number of rolls	123	121

B. Distribution of Mediums by Type:

Semichemical	31	32
Bogus	2	2
Kraft	0	1

C. New Participants:

None

None

D. Nonparticipants:

1. Chesapeake (West Point).	1. Chesapeake (West Point).
2. Continental Can (Hopewell No. 1).	2. Olinkraft (W. Monroe No. 1 and 3).
3. Olinkraft (W. Monroe Numbers 1, 2, and 3).	3. Owens-Ill., Inc. (Big Island No. 1 and 3).
4. St. Joe (Port St. Joe No. 1).	4. St. Regis (Coshocton No. 1).
5. St. Regis (Coshocton No. 1).	5. Union Camp (Monroe No. 2).
6. Union Camp (Monroe No. 2).	
7. West Virginia (Covington No. 7).	

PART II. QUALITY DATA

A. Summary of Physical Test Data

Test	Report	Current Machine Averages		F.K.I. Averages	
		Max.	Min.	Current	Cumulative
Basis weight, lb./1000 ft. ²	Cur.	29.0	25.0	26.9	27.0
	Prev.	28.5	25.4	26.9	27.0
Caliper, pt.	Cur.	11.5	9.0	10.3	10.4
	Prev.	11.6	9.2	10.3	10.4
Concora flat crush, p.s.i.	Cur.	51.8	36.4	42.5	43.0
	Prev.	50.8	34.9	42.9	43.0
Single-face flat crush, p.s.i.	Cur.	39.3	27.3	31.6	32.7
	Prev.	37.2	28.3	32.4	33.0

B. Summary of Runnability Data

Runnability		Previous Period			Current Period		
Speed, f.p.m.	Tension, lb./in.	No. of Rolls	% of Total	Cum., %	No. of Rolls	% of Total	Cum., %
<600	Min.	13	10.6	100.0	6	5.0	100.0
600	Min.	8	6.5	89.4	9	7.4	95.0
600	1/2	11	8.9	82.9	25	20.7	87.6
600	1	15	12.2	74.0	20	16.5	66.9
600	1-1/2	76	61.8	61.8	61	50.4	50.4

C. Trends in Quality Data in Current Report With Reference to Data from Previous Report

Physical Tests:

Basis weight:	Same as previous report.
Caliper:	Same as previous report.
Concora flat crush:	Decreased from 42.9 to 42.5 p.s.i.
Single-face flat crush:	Decreased from 32.4 to 31.6 p.s.i.

Comment: It may be noted that only minor quality changes are indicated for all four physical tests.

Runnability:

<600 f.p.m. at minimum tension:	Decreased from 10.6 to 5.0%.
600 f.p.m. at minimum tension:	Increased from 6.5 to 7.4%.
600 f.p.m. at 1/2 lb./in. tension:	Increased from 8.9 to 20.7%.
600 f.p.m. at 1 lb./in. tension:	Increased from 12.2 to 16.5%.
600 f.p.m. at 1-1/2 lb./in. tension:	Decreased from 61.8 to 50.4%.

Comment: Significant changes in runnability were noted at the following levels:

Level	Change
<600 f.p.m. at minimum tension	Significant decrease
600 f.p.m. at 1/2 lb./in. tension	Significant increase
600 f.p.m. at 1 lb./in. tension	Significant increase
600 f.p.m. at 1-1/2 lb./in. tension	Significant decrease

PART III. CONCORA CALIBRATION DATA

A. Summary of Data (Number and Percentage of Machines Included Within the Indicated Ranges)

Range, %	Previous Period		Current Period	
	No. of Machines	% of Total	No. of Machines	% of Total
<u>±</u> 1.0	4	15.4	5	20.0
<u>±</u> 2.5	10	38.5	10	40.0
<u>±</u> 5.0	12	46.2	15	60.0
<u>±</u> 10.0	22	84.6	24	96.0
Max.	26	100.0 ^a	25	100.0 ^b

B. Significance of Calibration Data

The current level of agreement between Institute and mill Concora flat crush data compares favorably with that for the previous report.

^aMaximum percentage difference was -16.3.

^bMaximum percentage difference was -10.6.

INTRODUCTION

As requested by the Technical Division of the Fourdrinier Kraft Board Institute, Inc., the reports pertinent to the continuous evaluation of corrugating medium have been prepared by The Institute of Paper Chemistry on a bimonthly instead of monthly basis since August 1, 1961. Report Five, however, covered a period of three months -- Aug., Sept., and Oct., 1967. This adjustment was requested by the Technical Division in order to have future bimonthly base-line reports on corrugating medium correspond, in terms of the period covered, to the bimonthly base-line reports on linerboard. It should also be noted, with regard to the periods covered by these reports, that the base-line study on corrugating medium was temporarily discontinued during the months of November and December, 1967, in accordance with instructions from the Technical Division. Hence, no report is available for these two months. The study was resumed on January 1, 1968 and the current report summarizes the data obtained during November and December, 1968, on 121 rolls of corrugating medium submitted for evaluation from thirty-five machines.

Each roll was evaluated at the Institute for basis weight, caliper, Concora flat crush (tested immediately after fluting), H. and D. flat crush on single-faced board, and runnability. The reader's attention is directed to the fact that the current base-line report is the fifth one in which Concora flat crush results were obtained on specimens tested immediately after fluting. Runnability was evaluated by corrugating each roll under standardized conditions on the Institute's single-facer into A-flute board at 600 feet per minute with minimum tension and recording the draw factor at this speed and tension if the roll ran satisfactorily. If unsatisfactory runnability occurred at this speed and tension, the single-facer was slowed down in increments of 25 f.p.m. using minimum tension

until satisfactory runnability was obtained, i.e., until there was no visual evidence of fractured flutes. In this latter case the draw factor was recorded for the highest speed below 600 f.p.m. (with minimum tension) at which the roll ran satisfactorily. On the other hand, if initial fabrication of the roll was satisfactory at 600 f.p.m. with minimum tension, further runs were made at 600 f.p.m. using higher tension to determine the maximum tension at 600 f.p.m. which the medium could sustain without visual evidence of fracturing. The higher tensions used at 600 f.p.m. were 0.5, 1.0, and 1.5 lb. per inch. For each roll, flat crush was determined on the single-faced board obtained at a speed of 600 f.p.m. with minimum tension, or if the roll could not be corrugated satisfactorily at 600 f.p.m. with minimum tension, flat crush was determined on the single-faced board obtained at the highest speed below 600 f.p.m. at which the medium could be corrugated with minimum tension. The flat crush results on the single-faced board, in addition to supplying information about quality, also provide data which may be useful to each participant as a means of evaluating the nature of the quantitative relationship between Concora flat crush and combined board flat crush for this medium.

For each participating machine, test data for the current period are shown in Table I and presented graphically in Fig. 1 and 2. A tabulation of the number of rolls and type of medium evaluated is also given in Table I for each machine. The current machine test averages given in Table I are the means for each test property of the averages obtained on all rolls of corrugating medium evaluated from a given machine during the current period. In addition to the current machine test averages, Table I also presents current F.K.I. averages, cumulative F.K.I. averages, and F.K.I. indexes. The current F.K.I. average for each test property is the mean of the current machine averages for the same property

TABLE I
SUMMARY OF CURRENT MACHINE AVERAGES
NOVEMBER - DECEMBER, 1968

MILL CODE	NO. OF ROLLS	TYPE OF MEDIUM	BASIS WEIGHT, LB.	CALIPER, POINTS	CONCORA FLAT CRUSH, P.S.I.	SINGLE-FACE FLAT CRUSH, P.S.I.
A	4	SEMICHEMICAL	26.1	9.6	41.3	30.1
B	4	SEMICHEMICAL	29.0	11.5	39.6	28.5
C	4	BOGUS	26.4	9.0	44.0	33.2
D	4	SEMICHEMICAL	25.9	10.6	37.7	27.6
E	4	SEMICHEMICAL	26.8	10.5	46.9	34.0
F	4	SEMICHEMICAL	27.4	10.9	44.2	32.7
G	4	SEMICHEMICAL	25.0	10.3	42.0	32.4
H	4	SEMICHEMICAL	25.6	9.8	45.6	34.4
I	4	SEMICHEMICAL	26.7	10.3	42.2	32.0
J	2	KRAFT	27.9	9.0	40.4	32.8
K	4	SEMICHEMICAL	27.7	11.1	38.5	27.3
L	2	SEMICHEMICAL	26.4	11.0	39.5	28.6
M	4	BOGUS	26.9	10.0	43.8	31.9
N	4	SEMICHEMICAL	27.1	9.7	42.0	30.6
O	4	SEMICHEMICAL	27.1	11.1	41.2	30.2
P	1	SEMICHEMICAL	25.9	10.7	42.2	33.3
Q	4	SEMICHEMICAL	26.2	10.5	38.8	28.8
R	4	SEMICHEMICAL	26.0	10.2	43.0	31.9
S	3	SEMICHEMICAL	27.1	9.7	41.4	31.7
T	4	SEMICHEMICAL	26.9	10.6	46.3	33.4
U	3	SEMICHEMICAL	27.4	10.7	42.3	29.4
V	2	SEMICHEMICAL	27.7	10.5	44.0	34.7
W	2	SEMICHEMICAL	26.3	9.2	36.4	29.8
X	4	SEMICHEMICAL	28.2	10.2	51.8	39.3
Y	4	SEMICHEMICAL	26.2	10.9	41.0	31.0
Z	4	SEMICHEMICAL	26.4	9.7	45.2	33.0
AA	4	SEMICHEMICAL	27.4	10.8	41.8	29.8
BB	4	SEMICHEMICAL	26.7	9.7	42.4	30.5
CC	1	SEMICHEMICAL	27.8	10.5	47.2	35.1
DD	4	SEMICHEMICAL	27.4	9.8	41.5	30.6
EE	4	SEMICHEMICAL	27.2	9.8	40.8	30.8
FF	4	SEMICHEMICAL	26.1	10.0	38.9	29.2
GG	2	SEMICHEMICAL	27.1	10.8	42.0	30.2
HH	3	SEMICHEMICAL	27.4	10.1	46.9	33.5
II	4	SEMICHEMICAL	26.9	10.4	45.2	33.4
TOTAL		121				
CURRENT F.K.I. AVERAGE			26.9	10.3	42.5	31.6
CUMULATIVE F.K.I. AVERAGE			27.0	10.4	43.0	32.7
F.K.I. INDEX, PERCENT			99.6	99.0	98.8	96.6

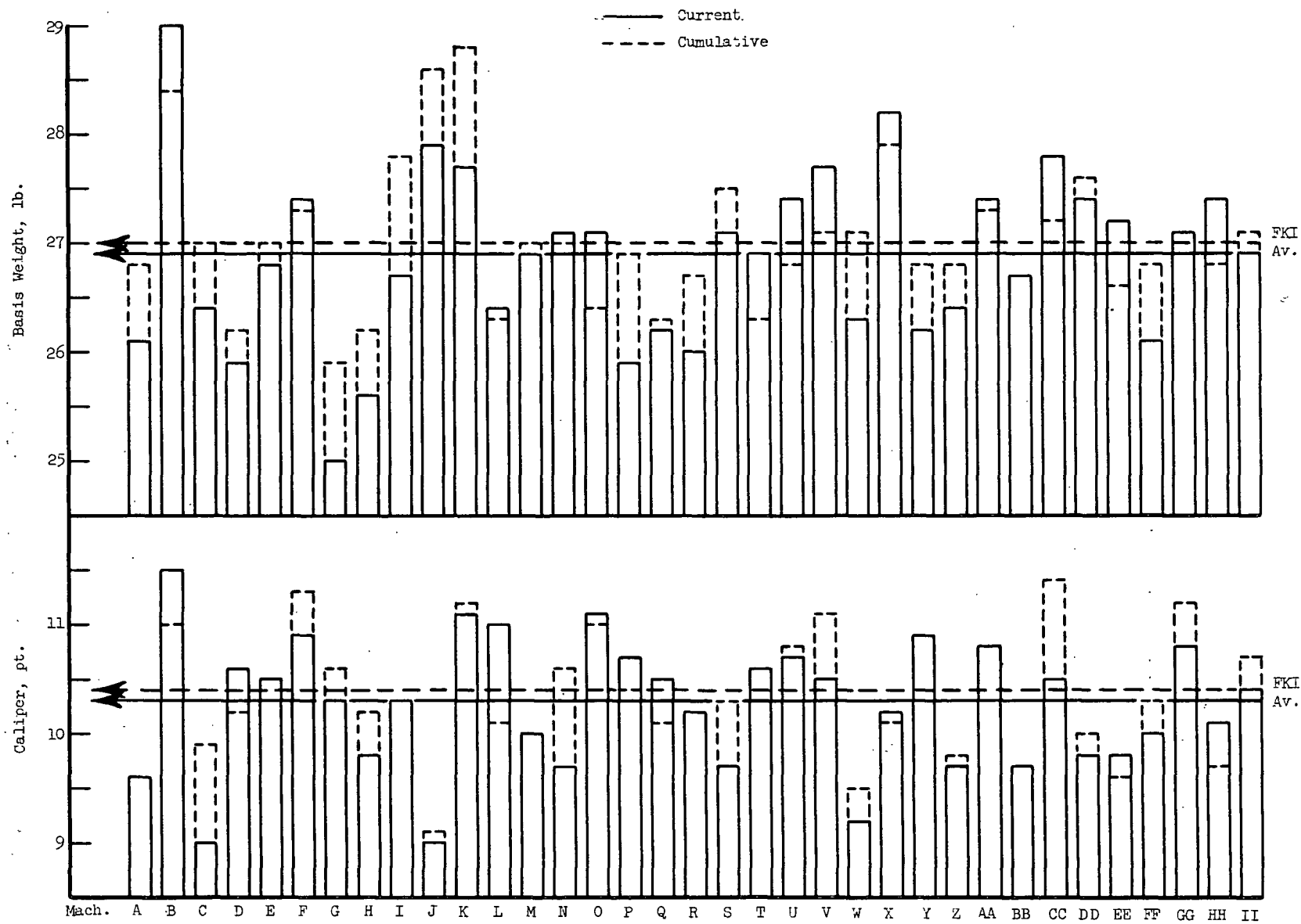
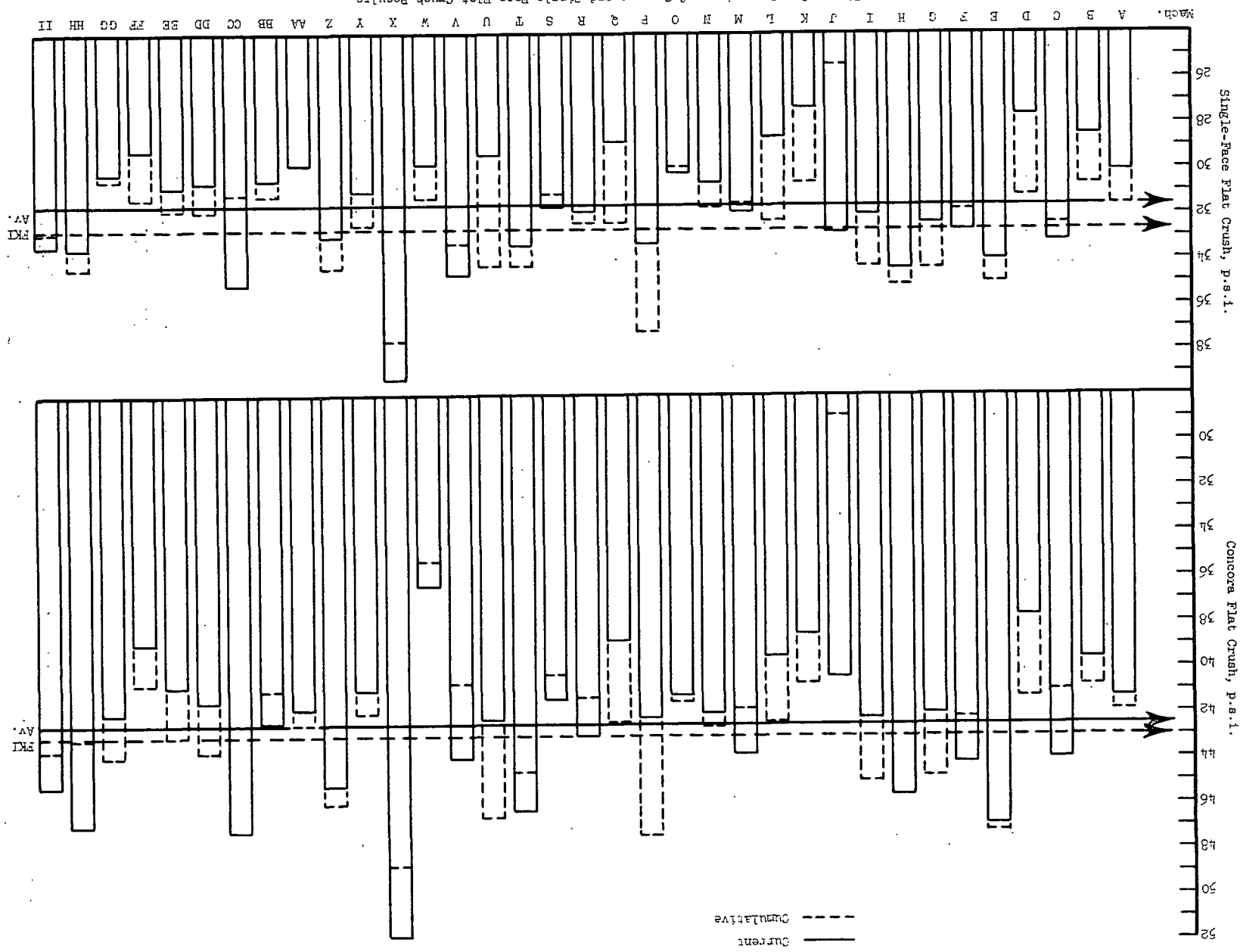


Figure 1. Comparison of Basis Weight and Caliper Results



for all machines participating in the study during a given period. The cumulative F.K.I. average for a given test property is the mean of the current F.K.I. averages for the same property for the previous twelve-month period excluding the average for the current period. The F.K.I. index for each test property 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 for each test property provides a convenient means of comparing current average quality with corresponding average quality for the previous six periods. An index greater than 100% indicates, of course, that current average quality is higher than the corresponding average quality for the previous six periods; similarly an index below 100% indicates that current average quality is lower than the corresponding average quality for the previous six periods.

The test results obtained on the rolls submitted from the production of individual machines during the current period are shown in Tables II through XXXVI for Machines A through Z and Machines AA, BB, CC, DD, EE, FF, GG, HH, and II, respectively. For each machine, the maximum, minimum and average results obtained on each roll are shown for all test properties except basis weight for which only the average is shown; in addition, the overall average result for all rolls submitted from a given machine is shown for each test property. The latter overall averages are reported as "current machine averages". A cumulative machine average for each test property is also shown and represents the mean of the current machine averages for the same property for the previous six periods (excluding the current period). Also shown for each machine and for each test property in Tables II to XXXVI are a machine factor and machine index which are defined as follows:

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

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

TABLE II

SUMMARY OF TEST RESULTS FOR MACHINE A

TYPE OF MEDIUM- SEMICHEMICAL														
CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	CALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY	
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.	LB./IN.*A	DRAW FACTOR*B
A-1	10-19-68	320	26.1	9.9	9.0	9.5	47.4	40.8	43.9	33.4	30.4	31.8	1.5	1.572
A-2	11- 4-68	321	26.3	9.6	8.6	9.1	43.8	39.0	40.9	30.0	28.2	29.4	1.5	1.574
A-3	11-26-68	322	26.0	10.2	9.4	9.9	45.0	37.2	41.3	31.2	30.0	30.7	1.5	1.572
A-4	12- 1-68	323	26.0	10.3	9.5	9.9	42.6	35.4	39.2	30.8	27.6	28.6	1.5	1.576
CURRENT MACHINE AVERAGE			26.1			9.6			41.3			30.1		1.574
CUMULATIVE MACHINE AVERAGE			26.8			9.6			41.9			31.6		
MACHINE FACTOR, PERCENT			97.4			100.0			98.6			95.2		
MACHINE INDEX, PERCENT			96.7			92.3			96.0			92.0		

Following footnotes for Tables II - XXXVI:

A Maximum tension at 600 f.p.m.
B 600 f.p.m. minimum tension.

TABLE III

SUMMARY OF TEST RESULTS FOR MACHINE B

TYPE OF MEDIUM- SEMICHEMICAL														
CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	CALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY	
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.	LB./IN.*A	DRAW FACTOR*B
B-1	10-24-68	3074	28.1	11.9	10.5	11.2	42.6	37.8	40.6	28.0	26.4	26.9	1.5	1.571
B-2	10-25-68	3131	30.6	12.8	11.8	12.4	41.4	35.4	39.0	29.4	26.4	27.7	1.5	1.560
B-3	11-13-68	3361	29.1	11.9	11.0	11.4	40.2	36.6	38.4	30.6	28.4	29.5	1.0	1.555
B-4	11-25-68	3721	28.0	11.9	10.7	11.0	42.0	39.0	40.6	30.8	29.0	29.8	0.5	1.548
CURRENT MACHINE AVERAGE			29.0			11.5			39.6			28.5		1.559
CUMULATIVE MACHINE AVERAGE			28.4			11.0			40.8			30.7		
MACHINE FACTOR, PERCENT			102.1			104.5			97.0			92.8		
MACHINE INDEX, PERCENT			107.4			110.6			92.1			87.2		

TABLE IV

SUMMARY OF TEST RESULTS FOR MACHINE C

TYPE OF MEDIUM- BOGUS														
CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	CALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY LB./IN.*A	DRAW FACTOR*B
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.		
C-1	10-10-68	516	27.4	10.0	9.0	9.4	47.4	42.6	45.2	34.2	32.2	33.4	1.5	1.566
C-2	10-29-68	517	27.0	10.0	9.0	9.5	45.6	39.0	42.1	34.8	31.0	33.0	1.5	1.571
C-3	11- 6-68	518	25.8	9.4	8.0	8.7	46.8	42.6	45.5	35.8	33.2	34.4	1.5	1.574
C-4	11-27-68	519	25.4	9.6	8.0	8.6	45.0	40.8	43.3	33.2	31.2	32.1	1.5	1.566
CURRENT MACHINE AVERAGE			26.4			9.0			44.0			33.2		1.569
CUMULATIVE MACHINE AVERAGE			27.0			9.9			41.0			32.4		
MACHINE FACTOR, PERCENT			97.8			90.9			107.3			102.5		
MACHINE INDEX, PERCENT			97.8			86.5			102.3			101.5		

TABLE V

SUMMARY OF TEST RESULTS FOR MACHINE D

TYPE OF MEDIUM- SEMICHEMICAL														
CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	CALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY LB./IN.*A	DRAW FACTOR*B
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.		
D-1	10-15-68	27	26.3	11.5	10.3	11.0	45.6	37.8	41.6	31.4	28.0	30.3	1.0	1.562
D-2	10-29-68	29	25.6	11.8	10.7	11.1	37.8	34.2	36.0	27.6	24.4	25.9	1.5	1.554
D-3	11-15-68	31	25.7	10.7	10.1	10.3	37.8	30.0	34.1	28.0	26.6	27.2	1.0	1.556
D-4	12- 6-68	33	26.0	10.1	9.8	10.0	45.6	36.0	39.1	28.2	26.0	27.1	1.5	1.567
CURRENT MACHINE AVERAGE			25.9			10.6			37.7			27.6		1.560
CUMULATIVE MACHINE AVERAGE			26.2			10.2			41.3			31.2		
MACHINE FACTOR, PERCENT			98.8			103.9			91.3			88.5		
MACHINE INDEX, PERCENT			95.9			101.9			87.7			84.4		

TABLE VI

SUMMARY OF TEST RESULTS FOR MACHINE E

TYPE OF MEDIUM- SEMICHEMICAL														
CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	CALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY LB./IN.*A	DRAW FACTOR*B
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.		
E-1	11- 6-68		26.5	10.9	9.8	10.4	48.6	43.8	45.4	33.2	30.4	31.6	1.0	1.560
E-2	11- 7-68		26.5	10.7	10.0	10.4	46.2	41.4	43.9	34.2	32.0	33.3	1.0	1.565
E-3	11-30-68		26.9	10.8	10.1	10.5	52.8	46.2	49.6	37.0	34.6	36.1	1.5	1.566
E-4	12- 1-68		27.4	10.8	10.3	10.6	54.0	43.8	48.8	37.2	33.2	35.2	1.5	1.564
CURRENT MACHINE AVERAGE			26.8			10.5			46.9			34.0		1.564
CUMULATIVE MACHINE AVERAGE			27.0			10.5			47.2			35.0		
MACHINE FACTOR, PERCENT			99.2			100.0			99.4			97.1		
MACHINE INDEX, PERCENT			99.2			101.0			109.1			104.0		

TABLE VII

SUMMARY OF TEST RESULTS FOR MACHINE F

TYPE OF MEDIUM- SEMICHEMICAL														
CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	CALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY LB./IN.*A	DRAW FACTOR*B
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.		
F-1	10- 7-68	167	27.8	12.0	11.0	11.4	50.4	40.8	45.1	33.0	30.4	31.8	NOTE C	1.557
F-2	10-16-68	168	27.5	11.0	9.9	10.7	50.4	45.0	47.4	36.0	35.0	35.5	NOTE D	1.557
F-3	11-23-68	169	27.4	11.5	10.3	10.9	49.2	40.2	44.6	34.0	32.0	33.1	NOTE E	1.553
F-4	11-24-68	170	26.7	11.2	9.8	10.7	44.4	37.2	39.6	32.2	29.6	30.3	NOTE F	1.550
CURRENT MACHINE AVERAGE			27.4			10.9			44.2			32.7		1.554
CUMULATIVE MACHINE AVERAGE			27.3			11.3			42.2			31.8		
MACHINE FACTOR, PERCENT			100.4			96.5			104.7			102.8		
MACHINE INDEX, PERCENT			101.5			104.8			102.8			100.0		

* See Table II for Notes A and B.

C Maximum speed at which this roll could be corrugated with minimum tension was 350 f.p.m.

D Maximum speed at which this roll could be corrugated with minimum tension was 500 f.p.m.

E Maximum speed at which this roll could be corrugated with minimum tension was 400 f.p.m.

F Maximum speed at which this roll could be corrugated with minimum tension was 300 f.p.m.

TABLE VIII

SUMMARY OF TEST RESULTS FOR MACHINE G

TYPE OF MEDIUM- SEMICHEMICAL														
CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	CALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY LB./IN.*A	DRAW FACTOR*B
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.		
G-1	11-14-68	19	24.9	10.1	9.0	9.4	43.8	40.2	42.5	34.8	28.4	32.4	MIN.	1.530
G-2	11-14-68	20	24.0	9.9	8.4	9.1	45.6	40.8	42.5	34.0	31.4	32.8	0.5	1.547
G-3	11-24-68	21	25.3	11.5	10.8	11.1	45.6	41.4	43.2	36.2	32.8	35.0	0.5	1.557
G-4	12- 4-68	22	25.7	12.2	11.0	11.6	40.2	39.0	39.7	30.6	28.6	29.6	NOTE C	1.536
CURRENT MACHINE AVERAGE			25.0			10.3			42.0			32.4		1.543
CUMULATIVE MACHINE AVERAGE			25.9			10.6			44.8			34.4		
MACHINE FACTOR, PERCENT			96.5			97.2			93.8			94.2		
MACHINE INDEX, PERCENT			92.6			99.0			97.7			99.1		

*See Table II for Notes A and B.

C Maximum speed at which this roll could be corrugated with minimum tension was 500 f.p.m.

TABLE IX

SUMMARY OF TEST RESULTS FOR MACHINE H

TYPE OF MEDIUM- SEMICHEMICAL														
H-1	10- 7-68	560	26.3	10.9	9.5	10.0	47.4	40.2	44.6	36.0	34.0	35.0	1.0	1.558
H-2	10-21-68	561	25.0	10.3	9.1	9.6	49.2	43.2	46.4	35.4	32.6	34.2	1.0	1.560
H-3	11-11-68	562	25.5	10.6	9.7	10.1	53.4	41.4	47.9	35.6	34.8	35.3	0.5	1.554
H-4	11-19-68	563	25.8	10.3	9.0	9.7	45.6	40.8	43.4	33.6	31.6	33.0	0.5	1.559
CURRENT MACHINE AVERAGE			25.6			9.8			45.6			34.4		1.558
CUMULATIVE MACHINE AVERAGE			26.2			10.2			45.6			35.1		
MACHINE FACTOR, PERCENT			97.7			96.1			100.0			98.0		
MACHINE INDEX, PERCENT			94.8			94.2			106.0			105.2		

TABLE X

SUMMARY OF TEST RESULTS FOR MACHINE I

TYPE OF MEDIUM- SEMICHEMICAL														
CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	CALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY DRAW	
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.	LB./IN.*A	FACTOR*8
I-1	10- 2-68	651	26.8	10.7	10.2	10.4	43.8	37.8	40.9	31.2	29.6	30.3	1.5	1.569
I-2	10-16-68	652	26.8	10.2	9.7	10.0	45.0	39.0	42.1	34.6	30.6	32.9	1.5	1.567
I-3	10-30-68	653	26.9	10.9	10.5	10.7	43.8	37.8	40.8	35.6	30.2	33.1	0.5	1.558
I-4	11-13-68	654	26.3	10.3	10.0	10.1	45.6	43.2	44.8	33.2	29.8	31.5	0.5	1.561
CURRENT MACHINE AVERAGE			26.7			10.3			42.2			32.0		1.564
CUMULATIVE MACHINE AVERAGE			27.8			10.3			45.0			34.3		
MACHINE FACTOR, PERCENT			96.0			100.0			93.8			93.3		
MACHINE INDEX, PERCENT			98.9			99.0			98.1			97.8		

TABLE XI

SUMMARY OF TEST RESULTS FOR MACHINE J

TYPE OF MEDIUM- KRAFT														
CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	CALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY DRAW	
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.	LB./IN.*A	FACTOR*8
J-1	11-22-68	5	27.9	9.4	8.5	8.9	42.0	37.2	40.0	33.4	31.0	32.2	0.5	1.560
J-2	11-22-68	6	27.9	9.5	8.5	9.1	44.4	38.4	40.7	35.0	32.2	33.4	0.5	1.569
CURRENT MACHINE AVERAGE			27.9			9.0			40.4			32.8		1.565
CUMULATIVE MACHINE AVERAGE			28.6			9.1			28.9			25.4		
MACHINE FACTOR, PERCENT			97.6			98.9			139.8			129.1		
MACHINE INDEX, PERCENT			103.3			86.5			94.0			100.3		

TABLE XII

SUMMARY OF TEST RESULTS FOR MACHINE K

TYPE OF MEDIUM- SEMICHEMICAL

CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	CALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY LB./IN.*A	DRAW FACTOR*B
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.		
K-1	10-23-68	4471	28.0	11.0	10.5	10.8	42.6	37.2	40.4	27.6	25.8	26.7	1.5	1.571
K-2	10-30-68	4411	27.9	10.9	10.3	10.5	43.8	39.0	40.4	30.4	27.8	28.9	1.5	1.568
K-3	11-22-68	4383	29.8	13.0	12.0	12.5	40.8	37.8	39.5	29.4	27.4	28.4	MIN.	1.545
K-4	11-30-68	4373	25.2	11.0	10.3	10.6	35.4	33.0	33.8	26.0	24.2	25.1	1.5	1.571
CURRENT MACHINE AVERAGE			27.7			11.1			38.5			27.3		1.564
CUMULATIVE MACHINE AVERAGE			28.8			11.2			40.7			30.6		
MACHINE FACTOR, PERCENT			96.2			99.1			94.6			89.2		
MACHINE INDEX, PERCENT			102.6			106.7			89.5			83.5		

TABLE XIII

SUMMARY OF TEST RESULTS FOR MACHINE L

TYPE OF MEDIUM- SEMICHEMICAL

L-1	11- 5-68	2912	26.3	11.5	10.5	11.0	42.0	36.0	39.0	30.4	26.4	28.2	1.5	1.572
L-2	12- 3-68	1382	26.4	11.7	10.8	11.1	43.2	36.0	40.0	29.8	28.2	29.0	1.5	1.570
CURRENT MACHINE AVERAGE			26.4			11.0			39.5			28.6		1.571
CUMULATIVE MACHINE AVERAGE			26.3			10.1			42.4			32.3		
MACHINE FACTOR, PERCENT			100.4			108.9			93.2			88.5		
MACHINE INDEX, PERCENT			97.8			105.8			91.9			87.5		

TABLE XIV

SUMMARY OF TEST RESULTS FOR MACHINE M

TYPE OF MEDIUM- BOGUS

CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	CALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY DRAW	
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.	LB./IN.*A	FACTOR*B
M-1	10-10-68	416	27.4	10.7	9.8	10.2	46.8	43.8	45.4	35.0	33.0	34.2	1.5	1.572
M-2	10-28-68	417	26.4	10.7	9.3	9.8	45.6	42.0	44.0	33.2	32.0	32.5	1.5	1.577
M-3	11-18-68	418	26.1	10.1	9.2	9.7	45.6	40.2	42.6	31.0	28.8	29.8	1.5	1.577
M-4	11-27-68	419	27.7	10.9	9.6	10.4	46.8	40.2	43.3	32.6	30.6	31.2	1.5	1.574
CURRENT MACHINE AVERAGE			26.9			10.0			43.8			31.9		1.575
CUMULATIVE MACHINE AVERAGE			27.0			10.0			41.8			31.5		
MACHINE FACTOR, PERCENT			99.6			100.0			104.8			101.3		
MACHINE INDEX, PERCENT			99.6			96.2			101.9			97.6		

TABLE XV

SUMMARY OF TEST RESULTS FOR MACHINE N

TYPE OF MEDIUM- SEMICHEMICAL

N-1	10-22-68	216	26.7	10.0	9.5	9.8	46.8	36.0	42.5	32.0	29.4	30.9	1.0	1.564
N-2	10-24-68	218	27.8	10.2	9.5	9.8	46.8	38.4	43.2	32.2	28.2	29.5	1.5	1.565
N-3	11-11-68	220	26.4	10.2	9.7	10.0	42.6	36.0	38.5	30.8	29.6	30.0	1.5	1.560
N-4	11-18-68	221	27.4	9.4	9.1	9.2	45.6	42.0	43.9	32.8	31.4	32.2	1.5	1.558
CURRENT MACHINE AVERAGE			27.1			9.7			42.0			30.6		1.562
CUMULATIVE MACHINE AVERAGE			27.0			10.6			42.6			31.7		
MACHINE FACTOR, PERCENT			100.4			91.5			98.6			96.5		
MACHINE INDEX, PERCENT			100.4			93.3			97.7			93.6		

TABLE XVI

SUMMARY OF TEST RESULTS FOR MACHINE O

TYPE OF MEDIUM- SEMICHEMICAL

CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	CALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY LB./IN.*A	DRAW FACTOR*B
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.		
0-1	11-22-68	43	27.3	11.9	10.8	11.3	40.8	34.8	38.5	29.2	28.0	28.7	MIN.	1.553
0-2	11-22-68	44	27.6	12.0	11.3	11.8	41.4	38.4	39.6	31.6	27.6	30.0	MIN.	1.553
0-3	12- 3-68	45	26.7	10.8	10.5	10.7	43.2	40.8	42.4	32.8	29.2	31.3	1.0	1.567
0-4	12- 3-68	46	26.8	11.0	10.2	10.7	46.8	43.2	44.5	32.2	29.6	30.8	1.5	1.569
CURRENT MACHINE AVERAGE			27.1			11.1			41.2			30.2		1.561
CUMULATIVE MACHINE AVERAGE			26.4			11.0			41.5			29.9		
MACHINE FACTOR, PERCENT			102.6			100.9			99.3			101.0		
MACHINE INDEX, PERCENT			100.4			106.7			95.8			92.4		

TABLE XVII

SUMMARY OF TEST RESULTS FOR MACHINE P

TYPE OF MEDIUM- SEMICHEMICAL

P-1	10- 4-68	817	25.9	11.3	10.0	10.7	46.2	40.8	42.2	34.8	32.2	33.3	1.5	1.558
CURRENT MACHINE AVERAGE			25.9			10.7			42.2			33.3		1.558
CUMULATIVE MACHINE AVERAGE			26.9			10.4			47.4			37.2		
MACHINE FACTOR, PERCENT			96.3			102.9			89.0			89.5		
MACHINE INDEX, PERCENT			95.9			102.9			98.1			101.8		

TABLE XVIII

SUMMARY OF TEST RESULTS FOR MACHINE Q

TYPE OF MEDIUM- SEMICHEMICAL														
CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	CALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY LB./IN.*A	DRAW FACTOR*B
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.		
Q-1	10-14-68	28	25.4	10.8	9.9	10.3	39.0	36.0	37.6	31.6	28.4	30.6	1.5	1.562
Q-2	10-28-68	30	26.6	11.8	11.0	11.3	43.8	31.8	36.8	27.2	23.6	26.3	0.5	1.562
Q-3	11-15-68	32	26.3	10.5	9.5	10.0	42.6	36.0	40.3	30.2	27.0	28.9	1.0	1.564
Q-4	12- 6-68	34	26.4	10.9	10.1	10.5	47.4	36.0	40.7	30.4	28.0	29.2	1.5	1.564
CURRENT MACHINE AVERAGE			26.2			10.5			38.8			28.8		1.563
CUMULATIVE MACHINE AVERAGE			26.3			10.1			42.4			32.4		
MACHINE FACTOR, PERCENT			99.6			104.0			91.5			88.9		
MACHINE INDEX, PERCENT			97.0			101.0			90.2			88.1		

TABLE XIX

SUMMARY OF TEST RESULTS FOR MACHINE R

TYPE OF MEDIUM- SEMICHEMICAL														
CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	CALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY LB./IN.*A	DRAW FACTOR*B
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.		
R-1	10-17-68	788	26.3	11.5	9.7	10.3	46.8	42.0	44.5	31.6	29.2	30.7	1.5	1.566
R-2	11- 6-68	789	26.7	11.4	10.1	10.8	46.2	41.4	43.3	35.0	31.6	33.8	0.5	1.553
R-3	11-15-68	790	25.4	10.2	8.9	9.7	43.8	40.2	42.0	32.6	31.4	32.2	1.5	1.570
R-4	12- 9-68	794	25.5	10.6	8.7	9.9	43.2	41.4	42.2	32.0	29.8	31.0	1.5	1.568
CURRENT MACHINE AVERAGE			26.0			10.2			43.0			31.9		1.564
CUMULATIVE MACHINE AVERAGE			26.7			10.2			41.3			32.4		
MACHINE FACTOR, PERCENT			97.4			100.0			104.1			98.4		
MACHINE INDEX, PERCENT			96.3			98.1			100.0			97.6		

TABLE XX

SUMMARY OF TEST RESULTS FOR MACHINE S

TYPE OF MEDIUM- SEMICHEMICAL														
CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	CALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY LB./IN.*A	DRAW FACTOR*B
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.		
S-1	10-24-68	16	27.9	10.6	10.0	10.3	42.0	37.2	39.4	32.6	30.4	31.6	1.5	1.567
S-2	11- 5-68	17	26.7	9.8	9.0	9.5	43.2	40.8	42.1	31.4	28.6	30.1	1.5	1.576
S-3	11-20-68	18	26.8	9.5	9.0	9.3	46.8	40.8	42.7	34.8	31.4	33.3	1.5	1.570
CURRENT MACHINE AVERAGE			27.1			9.7			41.4			31.7		1.571
CUMULATIVE MACHINE AVERAGE			27.5			10.3			40.3			31.1		
MACHINE FACTOR, PERCENT			98.5			94.2			102.7			101.9		
MACHINE INDEX, PERCENT			100.4			93.3			96.3			96.9		

TABLE XXI

SUMMARY OF TEST RESULTS FOR MACHINE T

TYPE OF MEDIUM- SEMICHEMICAL														
CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	CALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY LB./IN.*A	DRAW FACTOR*B
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.		
T-1	9-18-68	1190	25.7	11.3	10.0	10.6	46.2	40.2	43.4	32.6	28.8	30.5	NOTE C	1.540
T-2	10-10-68	1888	27.4	10.5	10.0	10.3	48.6	45.0	46.8	36.8	33.6	34.9	0.5	1.556
T-3	10-18-68	2125	27.0	11.0	10.3	10.7	48.6	43.2	45.6	35.4	31.2	33.3	MIN.	1.558
T-4	10-23-68	2302	27.6	11.2	10.5	10.8	53.4	46.2	49.4	37.4	34.4	35.1	MIN.	1.552
CURRENT MACHINE AVERAGE			26.9			10.6			46.3			33.4		1.552
CUMULATIVE MACHINE AVERAGE			26.3			10.6			44.6			34.3		
MACHINE FACTOR, PERCENT			102.3			100.0			103.8			97.4		
MACHINE INDEX, PERCENT			99.6			101.9			107.7			102.1		

*See Table II for Notes A and B.

C Maximum speed at which this roll could be corrugated with minimum tension was 500 f.p.m.

TABLE XXII

SUMMARY OF TEST RESULTS FOR MACHINE U

TYPE OF MEDIUM- SEMICHEMICAL

CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	CALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY	
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.	LB./IN.*A	DRAW FACTOR*B
U-1	10-23-68	7	27.4	11.0	10.3	10.7	42.6	36.0	39.6	30.8	27.8	29.2	1.5	1.567
U-2	10-23-68	8	26.8	10.9	10.2	10.5	43.2	40.2	42.0	29.2	26.4	28.0	1.5	1.565
U-3	11-22-68	9	28.0	11.1	10.8	11.0	48.0	43.8	45.4	33.2	29.8	31.0	1.5	1.570
CURRENT MACHINE AVERAGE			27.4			10.7			42.3			29.4		1.568
CUMULATIVE MACHINE AVERAGE			26.8			10.8			46.6			34.3		
MACHINE FACTOR, PERCENT			102.2			99.1			90.8			85.7		
MACHINE INDEX, PERCENT			101.5			102.9			98.4			89.9		

TABLE XXIII

SUMMARY OF TEST RESULTS FOR MACHINE V

TYPE OF MEDIUM- SEMICHEMICAL

V-1	9-28-68	270031	27.0	10.6	10.1	10.3	46.8	41.4	44.5	38.6	34.4	35.8	1.5	1.566
V-2	11-26-68	321502	28.4	10.9	10.1	10.7	46.2	37.2	43.6	34.6	32.0	33.6	1.0	1.565
CURRENT MACHINE AVERAGE			27.7			10.5			44.0			34.7		1.566
CUMULATIVE MACHINE AVERAGE			27.1			11.1			40.7			33.3		
MACHINE FACTOR, PERCENT			102.2			94.6			108.1			104.2		
MACHINE INDEX, PERCENT			102.6			101.0			102.3			106.1		

TABLE XXIV

SUMMARY OF TEST RESULTS FOR MACHINE W

TYPE OF MEDIUM- SEMICHEMICAL														
CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	CALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY DRAW	
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.	LB./IN.*A	FACTOR*B
W-1	11-15-68	K-1	26.9	9.5	8.8	9.2	37.2	34.2	36.1	30.2	29.0	29.6	1.5	1.574
W-2	11-15-68	K-2	25.7	9.8	8.8	9.2	40.2	33.0	36.6	31.0	28.4	30.0	1.5	1.572
CURRENT MACHINE AVERAGE			26.3			9.2			36.4			29.8		1.573
CUMULATIVE MACHINE AVERAGE			27.1			9.5			35.3			31.3		
MACHINE FACTOR, PERCENT			97.0			96.8			103.1			95.2		
MACHINE INDEX, PERCENT			97.4			88.5			84.6			91.1		

TABLE XXV

SUMMARY OF TEST RESULTS FOR MACHINE X

TYPE OF MEDIUM- SEMICHEMICAL														
CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	CALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY DRAW	
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.	LB./IN.*A	FACTOR*B
X-1	9-16-68	690	28.9	10.8	10.0	10.3	55.8	49.8	51.7	39.4	37.4	38.3	1.5	1.570
X-2	9-24-68	691	28.0	10.5	10.0	10.2	53.4	48.0	51.6	39.2	38.0	38.5	1.5	1.570
X-3	10-15-68	692	27.8	10.4	9.8	10.1	52.2	48.0	50.8	41.6	38.6	40.3	1.5	1.574
X-4	10-29-68	693	28.0	10.3	9.9	10.1	56.4	49.2	53.3	41.8	37.8	40.0	1.5	1.570
CURRENT MACHINE AVERAGE			28.2			10.2			51.8			39.3		1.571
CUMULATIVE MACHINE AVERAGE			27.9			10.1			48.7			37.6		
MACHINE FACTOR, PERCENT			101.1			101.0			106.4			104.5		
MACHINE INDEX, PERCENT			104.4			98.1			120.5			120.2		

TABLE XXVI

SUMMARY OF TEST RESULTS FOR MACHINE Y

TYPE OF MEDIUM- SEMICHEMICAL

CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	CALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY LB./IN.*A	DRAW FACTOR*B
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.		
Y-1	9-28-68	114	26.3	11.1	10.0	10.7	45.0	39.0	42.5	32.6	31.0	31.9	MIN.	1.551
Y-2		115	26.2	11.1	10.5	10.9	46.2	36.0	39.5	31.4	28.8	30.4	0.5	1.559
Y-3		116	26.2	11.7	10.8	11.1	44.4	36.0	40.7	31.2	27.2	30.0	0.5	1.560
Y-4		117	26.3	11.0	10.3	10.8	43.8	39.6	41.5	33.4	30.0	31.5	0.5	1.560
CURRENT MACHINE AVERAGE			26.2			10.9			41.0			31.0		1.558
CUMULATIVE MACHINE AVERAGE			26.8			10.9			42.0			32.5		
MACHINE FACTOR, PERCENT			97.8			100.0			97.6			95.4		
MACHINE INDEX, PERCENT			97.0			104.8			95.3			94.8		

TABLE XXVII

SUMMARY OF TEST RESULTS FOR MACHINE Z

TYPE OF MEDIUM- SEMICHEMICAL

Z-1	11- 6-68		26.8	10.0	9.8	9.9	46.8	43.8	45.6	34.6	33.2	34.0	0.5	1.558
Z-2	11- 7-68		26.7	10.0	9.7	9.8	45.6	40.8	43.6	32.8	29.0	31.6	1.0	1.557
Z-3	12- 1-68		26.0	10.0	9.2	9.6	48.0	40.8	44.4	34.6	31.4	33.3	0.5	1.561
Z-4	12- 9-68		26.3	9.8	9.3	9.6	49.8	44.4	47.2	33.4	32.4	32.9	1.5	1.564
CURRENT MACHINE AVERAGE			26.4			9.7			45.2			33.0		1.560
CUMULATIVE MACHINE AVERAGE			26.8			9.8			46.0			34.4		
MACHINE FACTOR, PERCENT			98.5			99.0			98.3			95.9		
MACHINE INDEX, PERCENT			97.8			93.3			105.1			100.9		

TABLE XXVIII

SUMMARY OF TEST RESULTS FOR MACHINE AA

TYPE OF MEDIUM- SEMICHEMICAL														
CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	CALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY LB./IN.*A	DRAW FACTOR*B
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.		
AA-1	10-18-68	1949	28.0	11.0	10.5	10.7	46.8	37.2	42.6	33.0	28.2	30.2	0.5	1.565
AA-2	10-18-68	1950	28.3	11.0	10.0	10.7	46.8	36.0	41.2	31.8	28.8	30.4	0.5	1.561
AA-3	12- 4-68	1957	26.4	11.3	10.7	11.0	46.2	36.0	41.8	31.6	28.0	29.8	0.5	1.563
AA-4	12- 4-68	1958	26.7	11.1	10.7	11.0	43.2	40.8	41.8	29.8	28.0	28.9	1.0	1.562
CURRENT MACHINE AVERAGE			27.4			10.8			41.8			29.8		1.563
CUMULATIVE MACHINE AVERAGE			27.3			10.8			42.5			29.8		
MACHINE FACTOR, PERCENT			100.4			100.0			98.4			100.0		
MACHINE INDEX, PERCENT			101.5			103.8			97.2			91.1		

TABLE XXIX

SUMMARY OF TEST RESULTS FOR MACHINE BB

TYPE OF MEDIUM- SEMICHEMICAL														
BB-1	10-26-68	1897	26.5	10.2	9.6	9.9	46.2	38.4	42.2	30.2	28.2	29.3	1.0	1.568
BB-2	10-28-68	1970	27.0	10.4	9.6	10.0	45.0	42.6	43.7	31.6	30.4	31.1	0.5	1.565
BB-3	11-19-68	2648	26.3	9.2	8.5	8.9	46.2	37.2	41.9	31.4	29.4	30.4	0.5	1.567
BB-4	12- 4-68	3048	27.1	10.3	9.5	9.9	43.8	38.4	42.0	32.6	29.4	31.1	0.5	1.565
CURRENT MACHINE AVERAGE			26.7			9.7			42.4			30.5		1.566
CUMULATIVE MACHINE AVERAGE			26.7			9.7			41.0			31.2		
MACHINE FACTOR, PERCENT			100.0			100.0			103.4			97.8		
MACHINE INDEX, PERCENT			98.9			93.3			98.6			93.3		

TABLE XXX

SUMMARY OF TEST RESULTS FOR MACHINE CC

TYPE OF MEDIUM- SEMICHEMICAL

CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	CALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY	
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.	LB./IN.*A	DRAW FACTOR*B
CC-1	6-29-68	107	27.8	10.9	10.2	10.5	49.2	46.2	47.2	35.8	34.6	35.1	1.0	1.562
CURRENT MACHINE AVERAGE			27.8			10.5			47.2			35.1		1.562
CUMULATIVE MACHINE AVERAGE			27.2			11.4						31.1		
MACHINE FACTOR, PERCENT			102.2			92.1						112.9		
MACHINE INDEX, PERCENT			103.0			101.0			109.8			107.3		

TABLE XXXI

SUMMARY OF TEST RESULTS FOR MACHINE DD

TYPE OF MEDIUM- SEMICHEMICAL

DD-1	10- 8-68	215	27.9	10.2	9.7	10.0	45.0	40.8	43.0	33.0	30.8	32.2	1.5	1.565
DD-2	10-22-68	217	27.7	9.9	9.3	9.7	45.6	40.8	42.6	31.4	28.6	29.7	1.5	1.564
DD-3	11- 7-68	219	27.6	10.0	9.2	9.5	47.4	41.4	43.4	34.4	32.0	33.0	1.5	1.561
DD-4	11-19-68	222	26.4	10.0	9.5	9.9	40.2	34.8	37.0	29.4	25.8	27.7	1.0	1.565
CURRENT MACHINE AVERAGE			27.4			9.8			41.5			30.6		1.564
CUMULATIVE MACHINE AVERAGE			27.6			10.0			43.7			31.9		
MACHINE FACTOR, PERCENT			99.3			98.0			95.0			95.9		
MACHINE INDEX, PERCENT			101.5			94.2			96.5			93.6		

TABLE XXXII

SUMMARY OF TEST RESULTS FOR MACHINE EE

TYPE OF MEDIUM- SEMICHEMICAL														
CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	GALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY	
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.	LB./IN.*A	DRAW FACTOR*8
EE-1	10-18-68	320	27.4	10.0	9.6	9.9	45.0	38.4	41.3	32.6	31.6	32.1	1.5	1.571
EE-2	11- 4-68	321	26.9	10.0	9.5	9.8	40.8	38.4	40.0	30.6	29.2	29.8	1.5	1.574
EE-3	11-28-68	322	27.6	10.4	9.6	9.9	42.0	40.2	41.4	32.4	30.0	31.4	1.5	1.573
EE-4	12- 1-68	323	26.7	9.9	9.3	9.7	43.8	38.4	40.4	30.6	29.0	29.9	1.5	1.572
CURRENT MACHINE AVERAGE			27.2			9.8			40.8			30.8		1.573
CUMULATIVE MACHINE AVERAGE			26.6			9.6			43.0			31.8		
MACHINE FACTOR, PERCENT			102.2			102.1			94.9			96.8		
MACHINE INDEX, PERCENT			100.7			94.2			94.9			94.2		

TABLE XXXIII

SUMMARY OF TEST RESULTS FOR MACHINE FF

TYPE OF MEDIUM- SEMICHEMICAL														
CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	GALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY	
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.	LB./IN.*A	DRAW FACTOR*8
FF-1	11- 7-68	185	26.1	10.2	9.8	10.0	43.2	38.4	40.8	30.4	28.6	29.5	1.5	1.573
FF-2	11- 7-68	186	26.1	10.1	9.8	10.0	43.2	39.0	41.3	31.0	29.4	30.2	1.5	1.573
FF-3	11-29-68	187	26.1	10.0	9.5	9.9	40.2	34.2	37.3	29.6	28.0	28.8	1.5	1.574
FF-4	11-30-68	188	26.0	10.5	9.9	10.2	38.4	33.0	36.1	29.0	28.0	28.5	1.5	1.572
CURRENT MACHINE AVERAGE			26.1			10.0			38.9			29.2		1.573
CUMULATIVE MACHINE AVERAGE			26.8			10.3			40.7			31.3		
MACHINE FACTOR, PERCENT			97.4			97.1			95.6			93.3		
MACHINE INDEX, PERCENT			96.7			96.2			90.5			89.3		

TABLE XXXIV

SUMMARY OF TEST RESULTS FOR MACHINE GG

TYPE OF MEDIUM- SEMICHEMICAL														
CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	CALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY LB./IN.*A	DRAW FACTOR*B
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.		
GG-1	11- 5-68	2132	27.1	11.0	9.8	10.7	43.2	36.0	40.3	31.4	30.2	30.7	1.5	1.573
GG-2	12- 2-68	982	27.1	11.6	10.9	11.0	49.2	42.0	43.7	31.4	28.2	29.7	1.0	1.570
CURRENT MACHINE AVERAGE			27.1	10.8			42.0			30.2			1.572	
CUMULATIVE MACHINE AVERAGE			27.1	11.2			43.9			30.5				
MACHINE FACTOR, PERCENT			100.0	96.4			95.7			99.0				
MACHINE INDEX, PERCENT			100.4	103.8			97.7			92.4				

TABLE XXXV

SUMMARY OF TEST RESULTS FOR MACHINE HH

TYPE OF MEDIUM- SEMICHEMICAL														
CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	CALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY LB./IN.*A	DRAW FACTOR*B
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.		
HH-1	10- 2-68	215	27.7	10.9	9.3	9.9	51.0	45.0	47.9	34.6	33.0	34.0	MIN.	1.530
HH-2	10-19-68	216	27.6	11.1	9.3	10.3	50.4	43.2	45.7	33.2	32.4	32.7	0.5	1.559
HH-3	10-19-68	217	27.0	11.0	9.4	10.2	51.0	45.0	47.2	35.0	32.8	33.9	MIN.	1.560
CURRENT MACHINE AVERAGE			27.4	10.1			46.9			33.5			1.550	
CUMULATIVE MACHINE AVERAGE			26.8	9.7			43.1			34.4				
MACHINE FACTOR, PERCENT			102.2	104.1			108.8			97.4				
MACHINE INDEX, PERCENT			101.5	97.1			109.1			102.4				

TABLE XXXVI

SUMMARY OF TEST RESULTS FOR MACHINE 11

TYPE OF MEDIUM- SEMICHEMICAL

CODE	DATE MADE	MILL ROLL NO.	BASIS WT., LB./M. SQ. FT.	CALIPER, PT.			CONCORA FLAT CRUSH, P.S.I.			SINGLE-FACE FLAT CRUSH, P.S.I.			RUNNABILITY	
				MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.	LB./IN.*A	DRAW FACTOR*B
II-1	11- 6-68		27.3	10.9	10.1	10.5	49.2	43.2	46.8	37.2	35.0	35.8	0.5	1.561
II-2	11- 7-68		27.0	11.3	9.9	10.4	48.6	42.6	46.7	35.2	32.0	33.8	1.0	1.562
II-3	11-29-68		26.6	10.7	10.1	10.4	46.2	40.2	43.6	33.8	31.0	32.2	1.0	1.566
II-4	11-30-68		26.8	10.7	10.3	10.4	46.2	39.6	43.6	33.0	30.2	31.8	1.0	1.564
CURRENT MACHINE AVERAGE			26.9			10.4			45.2			33.4		1.563
CUMULATIVE MACHINE AVERAGE			27.1			10.7			43.6			32.8		
MACHINE FACTOR, PERCENT			99.3			97.2			103.7			101.8		
MACHINE INDEX, PERCENT			99.6			100.0			105.1			102.1		

The machine factor and machine index provide a convenient means for comparing the current machine average for each test property with either the previous results obtained on the same machine for the same test property or with the cumulative result for all machines — i.e., the cumulative F.K.I. average for the same test property.

DISCUSSION OF RESULTS

Shown below from Table I are the maximum and minimum current machine averages obtained for each test property during the current period and the previous period. Also shown for each test property is the current F.K.I. average which represents the mean of the current machine averages and hence is indicative of the test level being maintained by the industry as a whole for each test property to the extent that the industry is represented by the participating machines. Also given for each test property is the cumulative F.K.I. average which represents the mean of the current F.K.I. averages for the previous six periods.

	Period	Current machine Averages		F.K.I. Averages	
		Maximum	Minimum	Current	Cumulative
Basis wt., lb./1000 ft. ²	Cur. ^a	29.0	25.0	26.9	27.0
	Prev. ^b	28.5	25.4	26.9	27.0
Caliper, pt.	Cur. ^a	11.5	9.0	10.3	10.4
	Prev. ^b	11.6	9.2	10.3	10.4
Concora flat crush, p.s.i.	Cur. ^a	51.8	36.4	42.5	43.0
	Prev. ^b	50.8	34.9	42.9	43.0
Single-face flat crush, p.s.i.	Cur. ^a	39.3	27.3	31.6	32.7
	Prev. ^b	37.2	28.3	32.4	33.0

The quality data summarized above for the current and previous periods reflect only minor changes for concora and single-face flat crush, basis weight and caliper remaining the same.

The runnability data for the 121 rolls evaluated during the current period and the 123 rolls evaluated during the previous period are summarized on the next page:

^a November and December, 1968.

^b September and October, 1968.

Runnability	Previous Period			Current Period		
	No. of Rolls	% of Total	Cum., %	No. of Rolls	% of Total	Cum., %
Less than 600 f.p.m. with minimum tension	13	10.6	100.0	6	5.0	100.0
600 f.p.m. - minimum tension	8	6.5	89.4	9	7.4	95.0
600 f.p.m. - 1/2 lb. per in. tension	11	8.9	82.9	25	20.7	87.6
600 f.p.m. - 1 lb. per in. tension	15	12.2	74.0	20	16.5	66.9
600 f.p.m. - 1-1/2 lb. per in. tension	76	61.8	61.8	61	50.4	50.4

It may be noted from the summaries of runnability data given above for the previous and current periods that significant changes in the data for the current period, with respect to data for the previous period, were evident at the following runnability levels:

Level	Change
600 f.p.m. at minimum tension	Significant decrease
600 f.p.m. at 1/2 lb./in. tension	Significant increase
600 f.p.m. at 1 lb./in. tension	Significant increase
600 f.p.m. at 1-1/2 lb./in. tension	Significant decrease

For both the current and previous periods the percentages of all rolls runnable at 600 f.p.m. with minimum tension were approximately the same.

Supplementary to the runnability data, draw factors were determined for each roll of medium at 600 f.p.m. with minimum tension (or, for rolls with poor runnability, at the maximum speed runnable with minimum tension) and are given in Tables II through XXXVI for Machines A to Z and Machines AA, BB, CC, DD, EE, FF, GG, HH, and II, respectively.

In Table XXXVII, an effort has been made to compare Institute and mill Concora flat crush test results for each machine for the current period. The comparisons shown in Table XXXVII are somewhat fragmentary because the participating

INSTITUTE AND MILL CONCORDA FLAT CRUSH TEST RESULTS ON INDIVIDUAL ROLLS FOR NOVEMBER AND DECEMBER, 1968

TABLE XXXVII

Machine A										Machine B										Machine C									
Concora Flat Crush, p.s.i.					Concora Flat Crush, p.s.i.					Concora Flat Crush, p.s.i.					Concora Flat Crush, p.s.i.					Concora Flat Crush, p.s.i.					Concora Flat Crush, p.s.i.				
Code	No.	Date	Made	tute	Insti- tute	Differ- ence ^a	Code	No.	Date	Made	tute	Insti- tute	Differ- ence ^a	Code	No.	Date	Made	tute	Insti- tute	Differ- ence ^a	Code	No.	Date	Made	tute	Insti- tute	Differ- ence ^a		
A-1	320	10-19-68	43.9	39.0	-4.9	B-1	3074	10-24-68	40.6	35.6	-5.0	C-1	516	10-10-68	45.2	38.8	-6.4												
A-2	321	11-4-68	40.9	36.5	-4.4	B-2	3131	10-25-68	39.0	38.5	-0.5	C-2	517	10-29-68	42.1	37.9	-4.2												
A-3	322	11-26-68	41.3	40.0	-1.3	B-3	3361	11-13-68	38.4	39.1	+0.7	C-3	518	11-6-68	45.5	43.3	-2.2												
A-4	323	12-1-68	36.1	39.2	-3.1	B-4	3721	11-25-68	40.6	37.1	-3.5	C-4	519	11-27-68	43.3	41.5	-1.8												
Current machine av.					41.3	Current machine av.					39.6	Current machine av.					44.0	Current machine av.					44.0	Current machine av.					
Machine D					Machine E					Machine F					Machine G					Machine H					Machine I				
D-1	27	10-15-68	41.6	30.2 ^b	-11.4	E-1	—	11-6-68	45.4	44.4	-1.0	F-1	167	10-7-68	45.1	38.6	-6.5												
D-2	29	10-29-68	36.0	34.3 ^b	-1.7	E-2	—	11-7-68	43.9	44.6	+0.7	F-2	168	10-16-68	47.4	45.4	-2.0												
D-3	31	11-15-68	34.1	33.7 ^b	-0.4	E-3	—	11-30-68	49.6	50.5	+0.9	F-3	169	11-23-68	44.6	39.0	-5.6												
D-4	33	12-6-68	39.1	33.6 ^b	-5.5	E-4	—	12-1-68	48.8	51.0	+2.2	F-4	170	11-24-68	39.6	36.0	-3.6												
Current machine av.					37.7	Current machine av.					46.9	Current machine av.					44.2	Current machine av.					44.2	Current machine av.					
Machine J					Machine K					Machine L					Machine M					Machine N					Machine O				
J-1	5	11-22-68	40.0	34.1 ^b	-5.9	K-1	4471	10-23-68	40.4	36.6	-3.8	L-1	2912	11-5-68	39.0	38.3	-0.7												
J-2	6	11-22-68	40.7	34.1 ^b	-6.6	K-2	4411	10-30-68	40.4	38.6	-1.8	L-2	1382	12-3-68	40.0	39.8	-0.2												
Current machine av.					40.4	Current machine av.					38.5	Current machine av.					39.5	Current machine av.					39.5	Current machine av.					
Machine P					Machine Q					Machine R					Machine S					Machine T					Machine U				
P-1	416	10-10-68	45.4	42.7	-2.7	Q-1	216	10-22-68	42.5	37.1	-5.4	R-1	43	11-22-68	38.5	39.0	+0.5												
P-2	417	10-28-68	44.0	38.9	-5.1	Q-2	218	10-24-68	43.2	42.6	-0.6	R-2	44	11-22-68	39.6	38.3	-1.3												
P-3	418	11-18-68	42.6	41.8	-0.8	Q-3	220	11-11-68	38.5	39.0	+0.5	R-3	45	12-3-68	42.4	— ^c	—												
P-4	419	11-27-68	43.3	39.4	-3.9	Q-4	221	11-18-68	43.9	42.0	-1.9	R-4	46	12-3-68	44.5	— ^c	—												
Current machine av.					43.8	Current machine av.					40.2	Current machine av.					39.0	Current machine av.					39.0	Current machine av.					
Machine V					Machine W					Machine X					Machine Y					Machine Z					Machine AA				
V-1	416	10-10-68	45.4	42.7	-2.7	W-1	216	10-22-68	42.5	37.1	-5.4	X-1	43	11-22-68	38.5	39.0	+0.5												
V-2	417	10-28-68	44.0	38.9	-5.1	W-2	218	10-24-68	43.2	42.6	-0.6	X-2	44	11-22-68	39.6	38.3	-1.3												
V-3	418	11-18-68	42.6	41.8	-0.8	W-3	220	11-11-68	38.5	39.0	+0.5	X-3	45	12-3-68	42.4	— ^c	—												
V-4	419	11-27-68	43.3	39.4	-3.9	W-4	221	11-18-68	43.9	42.0	-1.9	X-4	46	12-3-68	44.5	— ^c	—												
Current machine av.					43.8	Current machine av.					40.2	Current machine av.					39.0	Current machine av.					39.0	Current machine av.					
Machine V					Machine W					Machine X					Machine Y					Machine Z					Machine AA				
V-1	416	10-10-68	45.4	42.7	-2.7	W-1	216	10-22-68	42.5	37.1	-5.4	X-1	43	11-22-68	38.5	39.0	+0.5												
V-2	417	10-28-68	44.0	38.9	-5.1	W-2	218	10-24-68	43.2	42.6	-0.6	X-2	44	11-22-68	39.6	38.3	-1.3												
V-3	418	11-18-68	42.6	41.8	-0.8	W-3	220	11-11-68	38.5	39.0	+0.5	X-3	45	12-3-68	42.4	— ^c	—												
V-4	419	11-27-68	43.3	39.4	-3.9	W-4	221	11-18-68	43.9	42.0	-1.9	X-4	46	12-3-68	44.5	— ^c	—												
Current machine av.					43.8	Current machine av.					40.2	Current machine av.					39.0	Current machine av.					39.0	Current machine av.					
Machine V					Machine W					Machine X					Machine Y					Machine Z					Machine AA				
V-1	416	10-10-68	45.4	42.7	-2.7	W-1	216	10-22-68	42.5	37.1	-5.4	X-1	43	11-22-68	38.5	39.0	+0.5												
V-2	417	10-28-68	44.0	38.9	-5.1	W-2	218	10-24-68	43.2	42.6	-0.6	X-2	44	11-22-68	39.6	38.3	-1.3												
V-3	418	11-18-68	42.6	41.8	-0.8	W-3	220	11-11-68	38.5	39.0	+0.5	X-3	45	12-3-68	42.4	— ^c	—												
V-4	419	11-27-68	43.3	39.4	-3.9	W-4	221	11-18-68	43.9	42.0	-1.9	X-4	46	12-3-68	44.5	— ^c	—												
Current machine av.					43.8	Current machine av.					40.2	Current machine av.					39.0	Current machine av.					39.0	Current machine av.					
Machine V					Machine W					Machine X					Machine Y					Machine Z					Machine AA				
V-1	416	10-10-68	45.4	42.7	-2.7	W-1	216	10-22-68	42.5	37.1	-5.4	X-1	43	11-22-68	38.5	39.0	+0.5												
V-2	417	10-28-68	44.0	38.9	-5.1	W-2	218	10-24-68	43.2	42.6	-0.6	X-2	44	11-22-68	39.6	38.3	-1.3												
V-3	418	11-18-68	42.6	41.8	-0.8	W-3	220	11-11-68	38.5	39.0	+0.5	X-3	45	12-3-68	42.4	— ^c	—												
V-4	419	11-27-68	43.3	39.4	-3.9	W-4	221	11-18-68	43.9	42.0	-1.9	X-4	46	12-3-68	44.5	— ^c	—												
Current machine av.					43.8	Current machine av.					40.2	Current machine av.					39.0	Current machine av.					39.0	Current machine av.					
Machine V					Machine W					Machine X					Machine Y					Machine Z					Machine AA				
V-1	416	10-10-68	45.4	42.7	-2.7	W-1	216	10-22-68	42.5	37.1	-5.4	X-1	43	11-22-68	38.5	39.0	+0.5												
V-2	417	10-28-68	44.0	38.9	-5.1	W-2	218	10-24-68	43.2	42.6	-0.6	X-2	44	11-22-68	39.6	38.3	-1.3												
V-3	418	11-18-68	42.6	41.8	-0.8	W-3	220	11-11-68	38.5	39.0	+0.5	X-3	45	12-3-68	42.4	— ^c	—												
V-4	419	11-27-68	43.3	39.4	-3.9	W-4	221	11-18-68	43.9	42.0	-1.9	X-4	46	12-3-68	44.5	— ^c	—												
Current machine av.					43.8	Current machine av.					40.2	Current machine av.					39.0	Current machine av.					39.0	Current machine av.					
Machine V					Machine W					Machine X					Machine Y					Machine Z					Machine AA				
V-1	416	10-10-68	45.4	42.7	-2.7	W-1	216	10-22-68	42.5	37.1	-5.4	X-1	43	11-22-68	38.5	39.0	+0.5												
V-2	417	10-28-68	44.0	38.9	-5.1	W-2	218	10-24-68	43.2	42.6	-0.6	X-2	44	11-22-68	39.6	38.3	-1.3												
V-3	418	11-18-68	42.6	41.8	-0.8	W-3	220	11-11-68	38.5	39.0	+0.5	X-3	45	12-3-68	42.4	— ^c	—												
V-4	419	11-27-68	43.3	39.4	-3.9	W-4	221	11-18-68	43.9	42.0	-1.9	X-4	46	12-3-68	44.5	— ^c	—												
Current machine av.					43.8	Current machine av.					40.2	Current machine av.					39.0	Current machine av.					39.0	Current machine av.					
Machine V					Machine W					Machine X					Machine Y					Machine Z					Machine AA				
V-1	416	10-10-68	45.4	42.7	-2.7	W-1	216	10-22-68	42.5	37.1	-5.4	X-1	43	11-22-68	38.5	39.0	+0.5												
V-2	417	10-28-68	44.0	38.9	-5.1	W-2	218	10-24-68	43.2	42.6	-0.6	X-2	44	11-22-68	39.6	38.3	-1.3												
V-3	418	11-18-68	42.6	41.8	-0.8	W-3	220	11-11-68	38.5	39.0	+0.5	X-3	45	12-3-68	42.4	— ^c	—												
V-4	419	11-27-68	43.3	39.4	-3.9	W-4	221	11-18-68	43.9	42.0	-1.9	X-4	46	12-3-68	44.5	— ^c	—												
Current machine av.					43.8	Current machine av.					40.2	Current machine av.					39.0	Current machine av.					39.0	Current machine av.					
Machine V					Machine W					Machine X					Machine Y					Machine Z					Machine AA				
V-1	416	10-10-68	45.4	42.7	-2.7	W-1	216	10-22-68	42.5	37.1	-5.4	X-1	43	11-22-68	38.5	39.0	+0.5												
V-2	417	10-28-68	44.0	38.9	-5.1	W-2	218	10-24-68	43.2	42.6	-0.6	X-2	44	11-22-68	39.6	38.3	-1.3												
V-3	418	11-18-68	42.6	41.8	-0.8	W-3	220	11-11-68	38.5	39.0	+0.5	X-3	45	12-3-68	42.4	— ^c	—												
V-4	419	11-27-68	43.3	39.4	-3.9	W-4	221	11-18-68	43.9	42.0	-1.9	X-4	46	12-3-68	44.5	— ^c	—												
Current machine av.					43.8	Current machine av.					40.2	Current machine av.					39.0	Current machine av.					39.0	Current machine av.					
Machine V					Machine W					Machine X					Machine Y					Machine Z					Machine AA				
V-1	416	10-10-68	45.4	42.7	-2.7	W-1	216	10-22-68	42.5	37.1	-5.4	X-1	43	11-22-68	38.5	39.0	+0.5												
V-2	417	10-28-68	44.0	38.9	-5.1	W-2	218	10-24-68	43.2	42.6	-0.6	X-2	44	11-22-68	39.6	38.3	-1.3												
V-3	418	11-18-68	42.6	41.8	-0.8	W-3	220	11-11-68	38.5	39.0	+0.5	X-3	45	12-3-68	42.4	— ^c	—												
V-4	419	11-27-68	43.3	39.4	-3.9	W-4	221	11-18-68	43.9	42.0	-1.9	X-4	46	12-3-68	44.5	— ^c	—												

INSTITUTE AND MILL CONGORA FLAT CRUSH TEST RESULTS ON INDIVIDUAL ROLLS FOR NOVEMBER AND DECEMBER, 1968

TABLE XXXVII (continued)

Machine P									
Mill	Roll	Date Made	tute	Instl-	Differe	ence ^a	Code	No.	Roll
P-1	817	10-4-68	42.2	37.0 ^b	--	--	Q-1	28	10-14-68
							Q-2	30	10-28-68
							Q-3	32	11-15-68
							Q-4	34	12-6-68
Current machine av. 42.2									
Machine Q									
Mill	Roll	Date Made	tute	Instl-	Differe	ence ^a	Code	No.	Roll
							R-1	788	10-17-68
							R-2	789	11-6-68
							R-3	790	11-15-68
							R-4	794	12-9-68
Current machine av. 38.8									
Machine R									
Mill	Roll	Date Made	tute	Instl-	Differe	ence ^a	Code	No.	Roll
							U-1	7	10-23-68
							U-2	8	10-23-68
							U-3	9	11-22-68
Current machine av. 42.3									
Machine S									
Mill	Roll	Date Made	tute	Instl-	Differe	ence ^a	Code	No.	Roll
S-1	16	10-24-68	39.4	36.7	-2.7		T-1	1190	9-18-68
S-2	17	11-5-68	42.1	41.6	-0.5		T-2	1888	10-10-68
S-3	18	11-20-68	42.7	39.8	-2.9		T-3	2125	10-18-68
							T-4	2302	10-23-68
Current machine av. 41.4									
Machine V									
Mill	Roll	Date Made	tute	Instl-	Differe	ence ^a	Code	No.	Roll
V-1	270031	9-28-68	44.5	45.1	+0.6		W-1	K-1	11-15-68
V-2	321502	11-26-68	43.6	48.0	+4.4		W-2	K-2	11-15-68
Current machine av. 44.5									
Machine Y									
Mill	Roll	Date Made	tute	Instl-	Differe	ence ^a	Code	No.	Roll
Y-1	114	9-28-68	42.5	31.6 ^b	--		Z-1	--	11-6-68
Y-2	115		39.5	30.4 ^b	--		Z-2	--	11-7-68
Y-3	116		40.7	29.0 ^b	--		Z-3	--	12-1-68
Y-4	117		41.5	30.6 ^b	--		Z-4	--	12-9-68
Current machine av. 41.0									
Machine BB									
Mill	Roll	Date Made	tute	Instl-	Differe	ence ^a	Code	No.	Roll
BB-1	1897	10-26-68	42.2	41.6	-0.6		CC-1	107	6-29-68
BB-2	1970	10-28-68	43.7	44.2	+0.5				
BB-3	2648	11-19-68	41.9	41.5	-0.4				
BB-4	3048	12-4-68	42.0	42.5	+0.5				
Current machine av. 42.4									
Machine CC									
Mill	Roll	Date Made	tute	Instl-	Differe	ence ^a	Code	No.	Roll
							DD-1	215	10-8-68
							DD-2	217	10-22-68
							DD-3	219	11-7-68
							DD-4	222	11-19-68
Current machine av. 47.2									
Machine DD									
Mill	Roll	Date Made	tute	Instl-	Differe	ence ^a	Code	No.	Roll
							AA-1	1949	10-18-68
							AA-2	1950	10-18-68
							AA-3	1957	12-4-68
							AA-4	1958	12-4-68
Current machine av. 41.8									
Machine AA									
Mill	Roll	Date Made	tute	Instl-	Differe	ence ^a	Code	No.	Roll
							X-1	690	9-16-68
							X-2	691	9-24-68
							X-3	692	10-15-68
							X-4	693	10-29-68
Current machine av. 51.8									
Machine X									
Mill	Roll	Date Made	tute	Instl-	Differe	ence ^a	Code	No.	Roll
							Y-1	39.2 ^b	
							Y-2	39.8 ^b	
							Y-3	39.6 ^b	
							Y-4	40.4 ^b	
Current machine av. 42.3									
Machine Z									
Mill	Roll	Date Made	tute	Instl-	Differe	ence ^a	Code	No.	Roll
							AA-1	1949	10-18-68
							AA-2	1950	10-18-68
							AA-3	1957	12-4-68
							AA-4	1958	12-4-68
Current machine av. 45.2									
Machine CC									
Mill	Roll	Date Made	tute	Instl-	Differe	ence ^a	Code	No.	Roll
							DD-1	215	10-8-68
							DD-2	217	10-22-68
							DD-3	219	11-7-68
							DD-4	222	11-19-68
Current machine av. 47.2									
Machine DD									
Mill	Roll	Date Made	tute	Instl-	Differe	ence ^a	Code	No.	Roll
							DD-1	215	10-8-68
							DD-2	217	10-22-68
							DD-3	219	11-7-68
							DD-4	222	11-19-68
Current machine av. 43.8									

See end of table for footnotes.

TABLE XXXVII (continued)
INSTITUTE AND MILL CONCORDA FLAT CRUSH TEST RESULTS ON INDIVIDUAL ROLLS FOR NOVEMBER AND DECEMBER, 1968

Machine EE									
Concorda Flat Crush, p.s.i.									
Institute									
Code	No.	Date	Made	tute	Roll	Difference ^a	Code	No.	Date
EE-1	320	10-18-68	41.3	37.0	-4.3	FF-1	185	11-7-68	40.8
EE-2	321	11-4-68	40.0	35.8	-4.2	FF-2	186	11-7-68	41.3
EE-3	322	11-28-68	41.4	42.0	+0.6	FF-3	187	11-29-68	37.3
EE-4	323	12-1-68	40.4	40.1	-0.3	FF-4	188	11-30-68	36.1
Current machine av.									
Machine HH									
Concorda Flat Crush, p.s.i.									
Institute									
Code	No.	Date	Made	tute	Roll	Difference ^a	Code	No.	Date
HH-1	215	10-2-68	47.9	47.9	-	II-1	11-6-68	46.8	46.6
HH-2	216	10-19-68	45.7	47.2	-	II-2	11-7-68	46.7	46.9
HH-3	217	10-19-68	47.2	47.2	-	II-3	11-29-68	43.6	43.6
Current machine av.									
Machine II									
Concorda Flat Crush, p.s.i.									
Institute									
Code	No.	Date	Made	tute	Roll	Difference ^a	Code	No.	Date
GG-1	2132	11-5-68	40.3	42.4	+2.1	GG-1	2132	11-5-68	40.3
GG-2	982	12-2-68	43.7	40.2	-3.5	GG-2	982	12-2-68	43.7
Current machine av.									
Machine II									
Concorda Flat Crush, p.s.i.									
Institute									
Code	No.	Date	Made	tute	Roll	Difference ^a	Code	No.	Date
II-1	11-6-68	46.8	46.6	-0.2	II-1	11-6-68	46.8	46.6	-0.2
II-2	11-7-68	46.7	46.9	+0.2	II-2	11-7-68	46.7	46.9	+0.2
II-3	11-29-68	43.6	43.6	0.0	II-3	11-29-68	43.6	43.6	0.0
II-4	11-30-68	43.6	44.0	+0.4	II-4	11-30-68	43.6	44.0	+0.4
Current machine av.									

^aThis difference is the amount in p.s.i. units by which the mill results are higher or lower than the Institute results.
^bMill data were not obtained on specimens tested immediately after fluting.
^cNo data available.

mills are currently changing from submission of Concora flat crush data on conditioned specimens to submission of Concora flat crush data on specimens tested immediately after fluting. In those cases where mill Concora flat crush data are still obtained on specimens conditioned after fluting, no differences between Institute and mill averages for individual rolls are shown, no current machine averages based on mill data are shown, and no average differences between current machine averages based on Institute and mill data are shown. It is anticipated that more meaningful comparisons will be available for future reports as more mills complete this changeover. The inclusion of these comparisons is made possible by the fact that interested participants submit their Concora flat crush test results to The Institute of Paper Chemistry (on data sheets obtainable from the Institute). This affords each participant an opportunity to review the level of agreement noted for his data with the levels noted for the other participants. Comparisons of this kind are a helpful adjunct to other calibration procedures.

The Institute and mill Concora flat crush data obtained on specimens tested immediately after fluting (see Table XXXVII) are summarized in Part I of Table XXXVIII where the following information is given: (1) Current machine averages based on Institute data, (2) current machine average based on mill data, (3) the average difference — that is, the difference between the current machine average based on Institute data and the current machine average based on mill data, and (4) the maximum difference encountered in comparing Institute and mill test averages for individual rolls. In Part II of Table XXXVIII the average differences given in Part I are expressed as percentage differences. In the future, corresponding data (as it becomes available) from the previous two reports will be included so that the current levels of agreement may be interpreted with this additional information at hand.

TABLE XXXVIII

PART I: A COMPARATIVE SUMMARY FOR EACH MACHINE OF THE CONCORDA FLAT CRUSH AVERAGES BASED ON INSTITUTE DATA AND THOSE BASED ON MILL DATA

Machine Code	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	BB	CC	DD	EE	FF	GG	HH	II
Number of Rolls Compared	4	4	4	0	4	4	2	0	4	0	4	2	4	4	2	0	0	4	3	4	3	2	2	0	0	4	0	4	0	4	4	4	2	0	4
Concorda Flat Crush, p.s.i.																																			
Current machine av. (Institute) ^a	41.3	39.6	44.0	—	46.9	44.2	41.4	—	42.2	—	38.5	39.5	43.2	42.0	39.0	—	—	43.0	41.4	46.3	42.3	44.5	36.4	—	—	45.2	—	42.4	—	41.5	40.8	38.9	42.0	—	45.2
Current machine av. (Mill) ^a	37.9	37.6	40.4	—	47.6	39.8	41.1	—	42.0	—	36.9	39.0	40.7	40.2	38.6	—	—	40.1	39.1	42.1	37.8	46.6	35.0	—	—	44.6	—	42.4	—	43.8	38.7	39.8	41.3	—	45.3
Average difference ^b	-3.4	-2.0	-3.6	—	+0.7	-4.4	-0.3	—	-0.2	—	-1.6	-0.5	-3.1	-1.8	-0.4	—	—	-2.9	-2.0	-4.2	-4.5	+2.1	-1.4	—	—	-0.6	—	0.0	—	+2.3	-2.1	+0.9	-0.7	—	+0.1
Maximum difference ^c	-4.9	-5.0	-6.4	—	+2.2	-6.5	-3.4	—	-2.8	—	-3.8	-0.7	-5.1	-5.4	-1.3	—	—	-5.4	-2.9	-6.0	-6.4	+4.4	-1.7	—	—	-3.3	—	-0.6	—	+5.1	-4.3	+3.3	-3.5	—	+0.4

PART II: A TABULATION FOR EACH MACHINE OF THE AVERAGE DIFFERENCE (PERCENT) BETWEEN THE CONCORDA FLAT CRUSH BASED ON INSTITUTE DATA AND THAT BASED ON MILL DATA

Average difference, % ^d	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	BB	CC	DD	EE	FF	GG	HH	II
Current report (Nov.-Dec.)	-8.2	-5.1	-8.2	—	+1.5	-10.0	-0.7	—	-0.5	—	-4.2	-1.3	-7.1	-4.3	-1.0	—	—	-6.7	-4.8	-9.1	-10.6	+4.7	-3.8	—	—	-1.3	—	0.0	—	+5.5	-5.1	+2.3	-1.7	—	+0.2
10th Report (Sept.-Oct.)	-12.6	-7.7	-1.0	-2.5	+1.3	-14.5	-0.4	—	—	—	-6.5	-2.2	-9.2	+2.6	+7.1	—	+5.5	-7.9	-3.5	-2.0	-13.7	—	+2.0	—	—	+6.2	—	+0.2	—	-1.6	-16.3	+6.8	-9.7	—	+0.2
9th Report (July-Aug.)	-11.5	—	-6.8	—	-0.9	-4.2	-1.5	—	-4.2	—	—	—	-3.0	-2.4	—	—	—	+0.5	-9.9	-1.2	-12.4	+4.1	-2.8	—	—	-1.8	—	+9.5	—	-10.0	-11.0	+2.7	—	—	+3.8

^aComparisons based on current machine average include only those rolls for which mill data were submitted.

^bAverage difference is the difference between the current machine average based on Institute test results and that based on mill test results with the Institute test results used as the reference. See Table XXXVII.

^cMaximum difference is the greatest difference encountered in comparing Institute and mill test averages for individual rolls. See Table XXXVII.

^dAverage difference (percent) is computed by dividing the average difference in p.s.i. (shown above in Part I of this table) by the Institute current machine average and multiplying the result by 100.

In Table XXXIX, a summary of agreement between Institute and mill Concora flat crush data is given; this summary shows the number and percentage of machines for which the average percentage differences between Institute and mill Concora flat crush data were included within ranges of ± 1.0 , ± 2.5 , ± 5.0 , and $\pm 10.0\%$ (the number and percentage of machines with differences greater than $\pm 10.0\%$ is also given in Table XXXIX). Data for the previous period is also included to facilitate comparing the current level of agreement with that for the previous period.

TABLE XXXIX

SUMMARY OF AGREEMENT BETWEEN INSTITUTE AND
MILL CONCORA FLAT CRUSH DATA

Average Percentage Difference Between Institute and Mill Concora Flat Crush Test Results ^a	Number and Percentage of Machines Included Within the Indicated Ranges			
	Previous Period ^b		Current Period ^c	
	Number	Percent	Number	Percent
± 1.0	4	15.4	5	20.0
± 2.5	10	38.5	10	40.0
± 5.0	12	46.2	15	60.0
± 10.0	22	84.6	24	96.0
Max.	26	100.0 ^d	25	100.0 ^e

^aThe average obtained at the Institute was used as the reference in the calculation of the percentage difference.

^bSeptember and October, 1968.

^cNovember and December, 1968.

^dMaximum percentage difference was -16.3.

^eMaximum percentage difference was -10.6.

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A handwritten signature in dark ink, appearing to read "R. C. McKee", is written over a horizontal line.

R. C. McKee, Chairman
Container Section

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