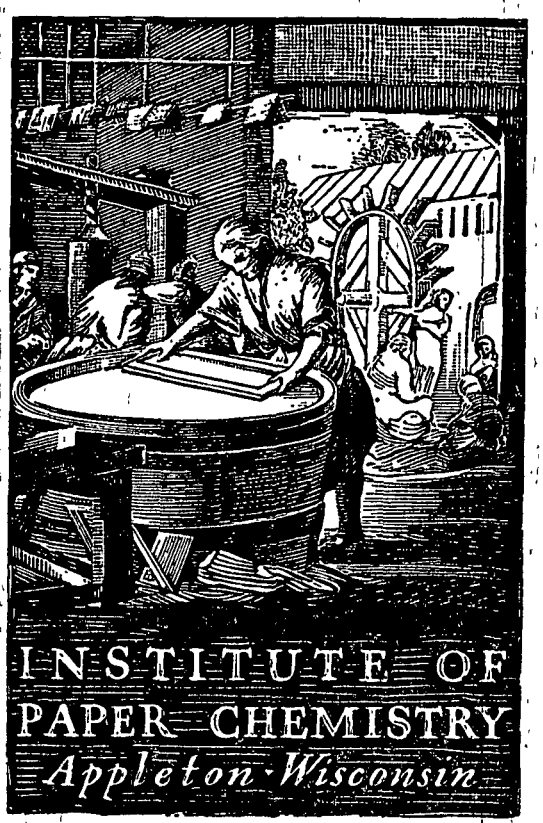

CONTINUOUS EVALUATION OF CORRUGATING MEDIUM

Project 1108-17

Report 102

A Progress Report

to

FOURDRINIER KRAFT BOARD INSTITUTE, INC.

August 1, 1963

Code Letters for Progress Report 102
Project 1108-17

August 1, 1963.

	Machine No.	Code Letter
The Chesapeake Corporation--West Point	1	--
Container Corporation of America--Circleville	1	V
Continental Can Company, Inc.--Hopewell	1	F
--Hodge	1	W
Crown Zellerbach Corporation--Baltimore	1	U
--Baltimore	2	Q
--Bogalusa	4	L
--Lebanon	1	--
--Lebanon	2	T
International Paper Company--Bastrop	1	N
--Bastrop	2	H
--Georgetown	1	K
The Mead Corporation--Harriman	1	R
--Knoxville	1	--
--Lynchburg	2	D
--Sylva	1	--
Olin Mathieson Chemical Corporation--Monroe	1	--
--Monroe	2	--
Owens-Illinois Glass Company--Big Island	3	E
--Tomahawk	1	G
--Tomahawk	2	A
--Tomahawk	3	M
Packaging Corporation of America--Filer City	1	B
--Filer City	2	J
St. Joe Paper Company--Port St. Joe	1	I
St. Regis Container Corporation (Mill Division--Coshocton)	1	S
Union Bag-Camp Paper Corporation--Savannah	2	O
West Virginia Pulp and Paper Company--Covington	6	P
--Covington	7	--
--Charleston--		--
Weyerhaeuser Company North Carolina Division--Plymouth	3	C

THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

CONTINUOUS EVALUATION OF CORRUGATING MEDIUM

Project 1108-17

Report 102

A Progress Report

to

FOURDRINIER KRAFT BOARD INSTITUTE, INC.

August 1, 1963

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THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

CONTINUOUS EVALUATION OF CORRUGATING MEDIUM

INTRODUCTION

As requested by the Technical Committee of the Fourdrinier Kraft Board Institute, Inc., the reports pertinent to the continuous evaluation of corrugating medium are prepared by The Institute of Paper Chemistry on a bimonthly basis instead of the previous monthly basis. This system was initiated on August 1, 1961. This twelfth report under the bimonthly system presents results obtained during the months of June and July, 1963.

During the twelfth bimonthly period, 158 rolls of corrugating medium representing the production of twenty-three machines were evaluated. A tabulation of the number of rolls and type of medium submitted from each machine is given in Table I. In connection with the data given in Table I, it should be mentioned that, effective September 1, 1961, at the request of the Technical Committee, the limit on the number of rolls submitted for evaluation from each machine during a given month was reduced from six to four.

Each sample of corrugating medium was evaluated for basis weight, caliper, Concora flat crush (conditioned after fluting), H. and D. flat crush on single-faced board, and runnability. Runnability 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 runnability occurred at this speed, the corrugator was slowed down in increments of 25 f.p.m. until satisfactory runnability was obtained—i.e., 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.

TABLE I

NUMBER OF ROLLS AND TYPE OF CORRUGATING MEDIUM SUBMITTED FOR EVALUATION FROM EACH MACHINE

June and July, 1963

Machine Code	Number of Rolls	Type
A	8	Semichemical
B	8	Semichemical
C	8	Semichemical
D	6	Semichemical
E	4	Semichemical
F	9	Semichemical
G	8	Semichemical
H	4	Semichemical
I	12	Kraft
J	8	Semichemical
K	5	Semichemical
L	4	Semichemical
M	8	Semichemical
N	3	Semichemical
O	9	Semichemical
P	4	Semichemical
Q	11	Bogus
R	8	Semichemical
S	2	Bogus
T	4	Semichemical
U	10	Bogus
V	8	Semichemical
W	7	Semichemical
Total	158	

Flat crush was determined on the single-faced board obtained at a speed of 600 f.p.m. with minimum tension. The flat crush results, in addition to supplying information about quality, 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.

For each participating machine, the current machine averages associated with the current period are shown for each test in Table II and presented graphically in Fig. 1 to 4. The current machine average is the average of the test results obtained on all rolls of corrugating medium evaluated from a given machine during the current period. In addition to 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 for each test is the average of the test results for all machines participating in the study during a given period. The cumulative F.K.I. average for each test is determined by averaging the results for the previous twelve-month period excluding the result for the current period. The F.K.I. index for each test 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 individual machines during the current period are shown in Tables III through XXV for Machines A through W., respectively. The maximum, minimum, and

TABLE II

SUMMARY OF CURRENT MACHINE AVERAGES

June and July, 1963

Mill Code	Basis Weight, lb.	Caliper, points	Concora Flat Crush, p.s.i.	Single-Face Flat Crush, p.s.i.
A	26.6	10.4	38.4	34.0
B	25.9	10.2	34.7	30.9
C	26.8	10.5	37.5	34.8
D	26.8	10.2	36.4	32.3
E	26.7	10.5	35.2	30.6
F	26.6	10.8	37.5	34.5
G	26.7	10.0	38.6	34.4
H	26.2	10.4	38.6	35.2
I	27.1	9.3	34.9	30.1
J	26.2	9.7	35.6	31.6
K	27.5	10.5	40.1	34.8
L	26.4	10.0	34.9	30.9
M	26.9	10.2	35.9	32.0
N	26.3	10.6	39.8	37.1
O	26.0	9.1	38.0	33.0
P	27.1	10.6	36.2	33.9
Q	26.7	9.6	37.3	33.9
R	28.0	11.0	35.8	32.3
S		See Note[a]		
T	24.6	10.5	26.3	24.1
U	27.4	10.2	34.1	30.6
V	26.5	10.8	34.3	31.7
W	27.8	10.5	36.0	32.5
Current F.K.I. average	26.7	10.3	36.2	32.5
Cumulative F.K.I. average	27.1	10.2	36.6	33.1
F.K.I. index, %	98.4	100.1	98.9	98.2

[a] Current machine averages have been omitted in compliance with Technical Committee's request that current machine averages based on evaluations of fewer than three rolls of medium should be excluded from the summary table and from the calculation of the current F.K.I. averages.

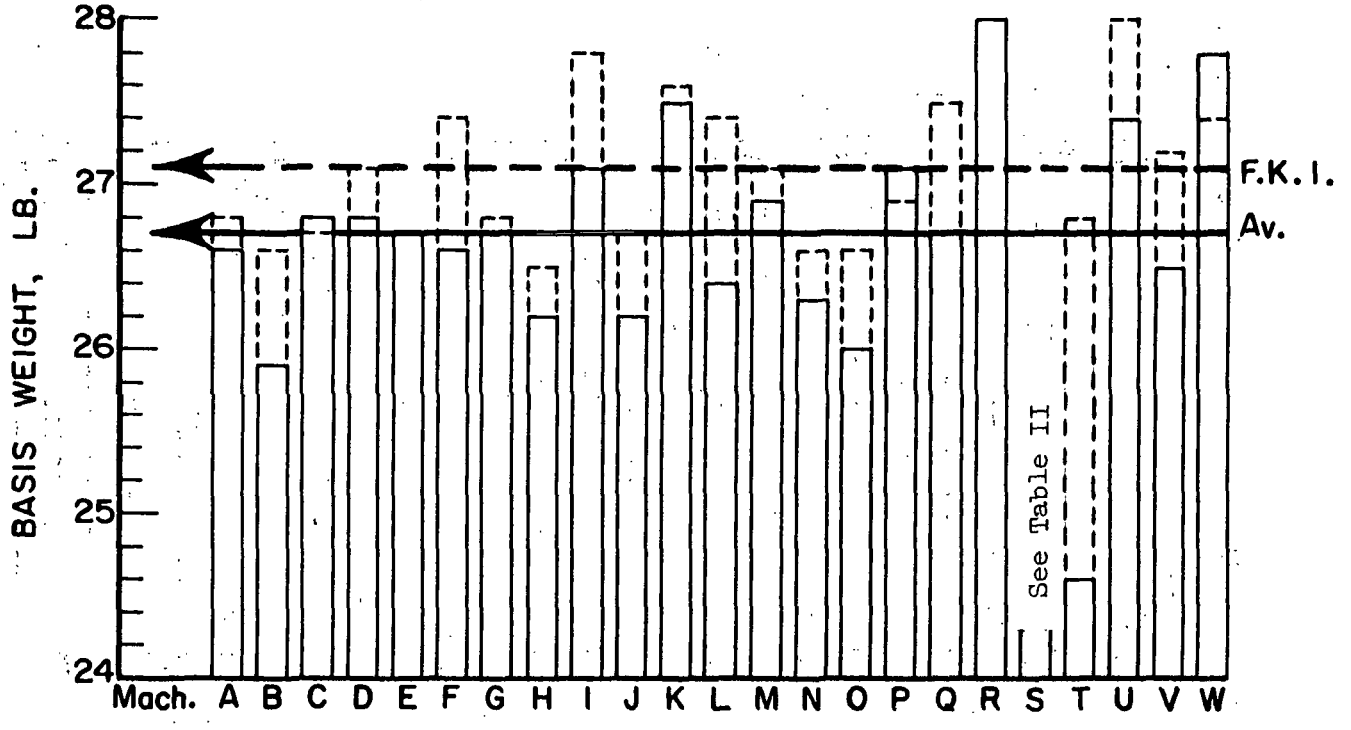

Figure 1. Comparison of Basis Weight Results

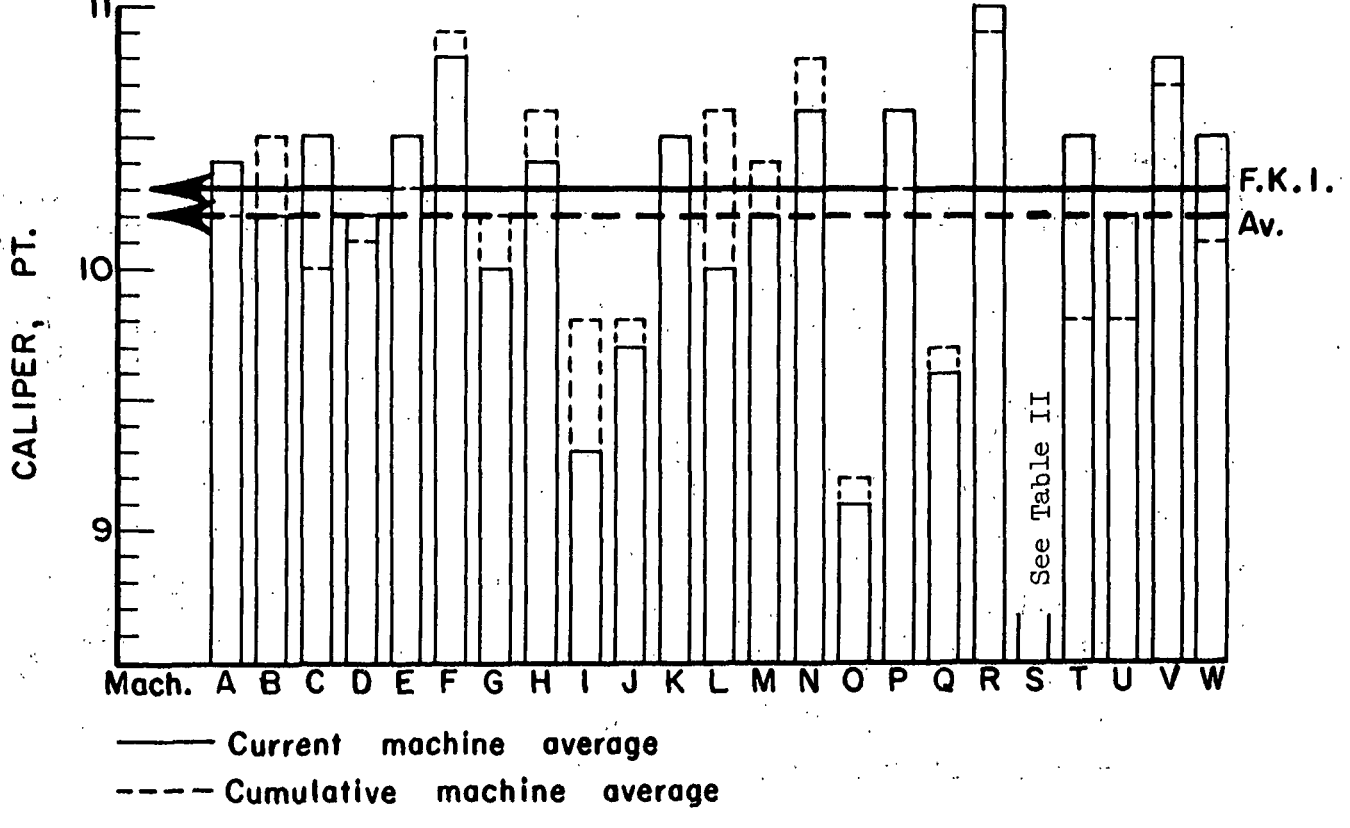

Figure 2. Comparison of Caliper Results

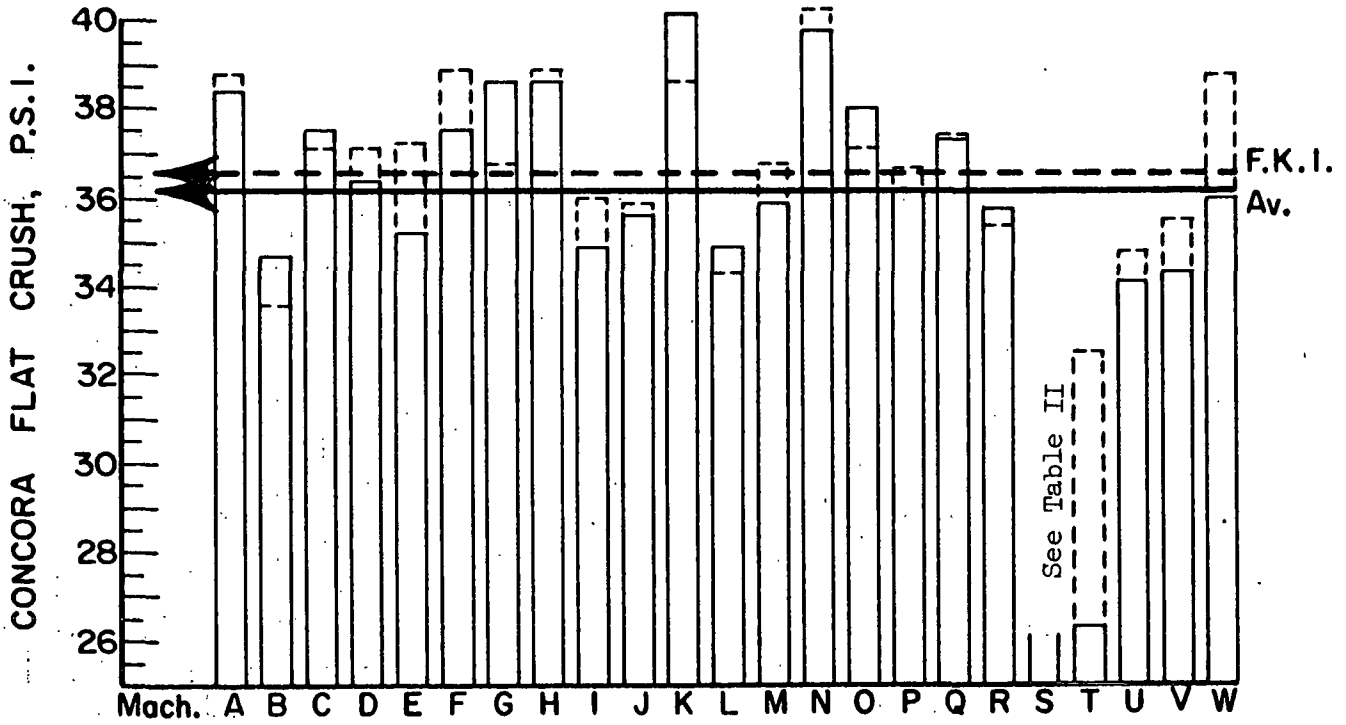

Figure 3. Comparison of Concora Flat Crush Results

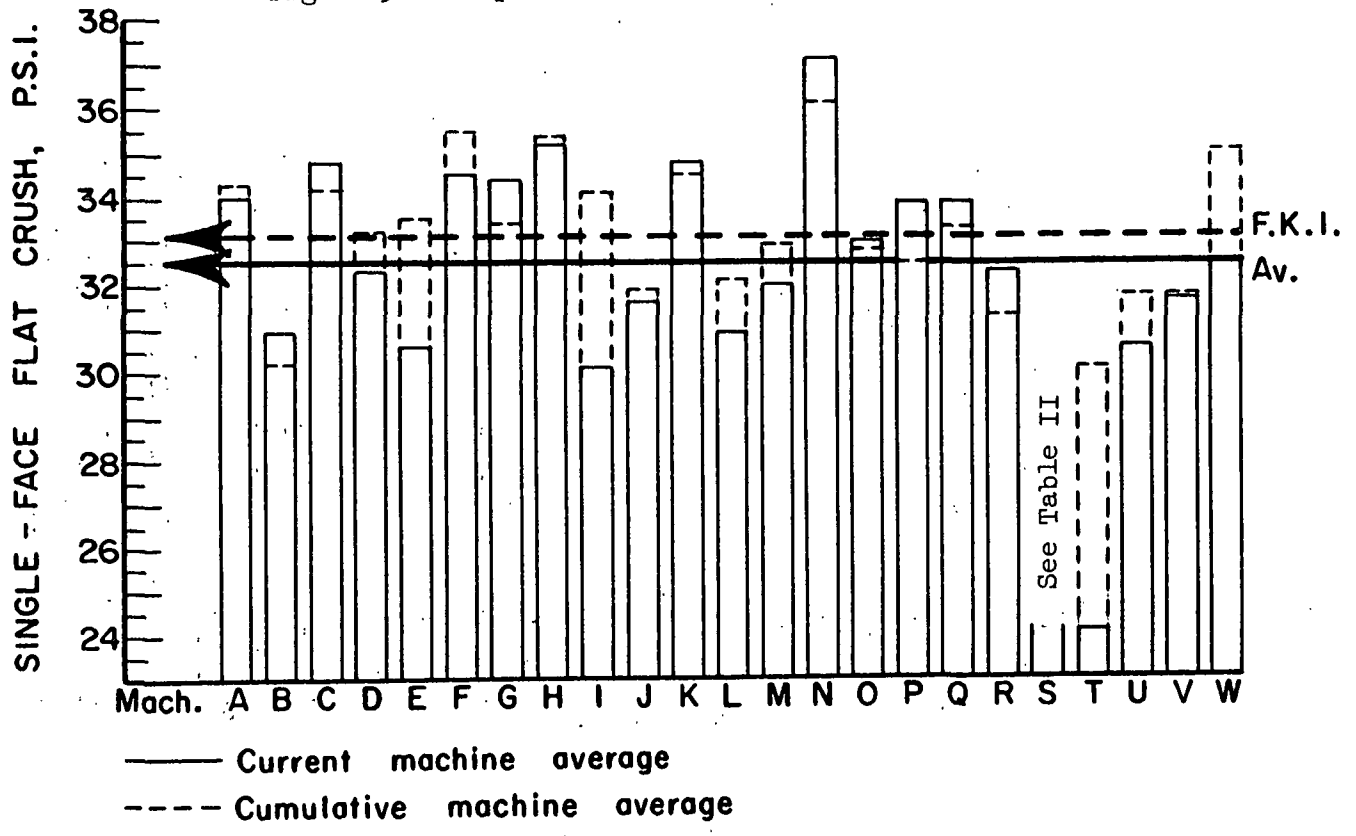

Figure 4. Comparison of Single-Face Flat Crush Results

TABLE III

SUMMARY OF TEST RESULTS FOR MACHINE A

June and July, 1963
(Type of Medium: Semichemical)

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb./M sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m. lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
A-1	6-14-63	6-25-63	--	26.5	10.7	10.0	10.4	41.4	34.2	38.2	35.6	32.4	34.2	1/2
A-2	6-18-63	6-25-63	--	27.8	11.0	10.0	10.5	42.0	39.0	40.7	37.2	32.0	35.6	1-1/2
A-3	6-20-63	6-27-63	--	26.4	10.6	10.0	10.2	39.0	37.2	37.7	35.4	34.0	34.7	1/2
A-4	6-23-63	6-27-63	--	26.4	10.7	10.0	10.2	40.2	36.0	38.9	37.0	33.8	35.6	Min.
A-5	7-13-63	7-25-63	--	26.2	10.5	10.0	10.2	41.4	37.2	39.4	34.4	32.4	33.6	1/2
A-6	7-15-63	7-25-63	--	26.7	11.3	10.6	10.9	38.4	36.0	36.8	32.6	31.4	32.1	Min.
A-7	7-16-63	7-25-63	--	26.4	10.9	10.3	10.6	40.8	34.8	37.8	33.0	31.8	32.4	1-1/2
A-8	7-17-63	7-25-63	--	26.4	10.7	9.8	10.2	39.6	35.4	38.2	34.2	33.0	33.7	1
Current machine average				26.6			10.4			38.4			34.0	
Cumulative machine average				26.8			10.2			38.8			34.3	
Machine factor, %				99.2			101.6			99.2			99.2	
Machine index, %				98.1			101.6			105.1			102.7	

TABLE IV

SUMMARY OF TEST RESULTS FOR MACHINE B

June and July, 1963
(Type of Medium: Semichemical)

B-1	5-27-63	6-10-63	68	26.0	10.7	10.0	10.4	34.8	32.4	33.5	32.4	30.2	31.3	1-1/2
B-2	5-31-63	6-11-63	69	25.9	10.8	9.8	10.1	37.2	33.6	35.2	31.2	28.2	29.6	1-1/2
B-3	6-10-63	6-14-63	70	25.8	11.0	10.5	10.6	40.2	29.4	33.8	29.6	28.4	29.2	1
B-4	6-17-63	6-21-63	71	26.0	10.9	10.0	10.4	34.8	33.0	33.8	31.8	28.8	30.6	1-1/2
B-5	6-24-63	7- 1-63	72	26.2	10.8	10.2	10.4	36.6	33.0	34.1	31.6	29.4	30.1	1-1/2
B-6	7- 1-63	7- 8-63	73	25.3	9.9	9.3	9.6	40.2	34.2	37.3	34.0	31.4	32.8	1-1/2
B-7	7- 8-63	7-12-63	74	26.0	10.4	9.8	10.0	37.8	32.4	35.2	34.6	32.0	33.0	1-1/2
B-8	7-17-63	7-23-63	75	26.4	10.9	9.8	10.4	35.4	33.6	34.4	32.0	30.4	30.7	1-1/2
Current machine average				25.9			10.2			34.7			30.9	
Cumulative machine average				26.6			10.5			33.6			30.2	
Machine factor, %				97.6			97.8			103.1			102.4	
Machine index, %				95.7			100.0			94.8			93.4	

TABLE V

SUMMARY OF TEST RESULTS FOR MACHINE C

June and July, 1963
(Type of Medium: Semichemical)

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb./M sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
C-1	5- 6-63	5-31-63	135	27.0	10.5	9.9	10.2	40.2	33.0	36.6	35.6	33.0	34.4	1-1/2
C-2	5-20-63	6- 3-63	597	26.3	11.0	10.1	10.7	39.0	33.0	35.5	35.6	33.8	34.8	Min.
C-3	5-27-63	6-11-63	829	26.4	10.6	10.0	10.4	39.0	34.8	36.7	34.0	31.8	33.3	Min.
C-4	6- 9-63	7- 2-63	262	27.3	11.2	10.4	10.8	39.0	32.4	35.6	35.4	33.0	34.1	Min.
C-5	6-14-63	7- 2-63	425	26.7	10.7	10.1	10.5	40.2	35.4	38.9	38.4	34.8	37.1	1
C-6	6-25-63	7-19-63	770	26.9	10.8	10.2	10.6	39.0	34.2	36.6	34.4	32.6	33.3	1/2
C-7	7- 2-63	7-12-63	36	27.0	11.7	10.6	11.2	41.4	39.0	39.8	36.2	34.8	35.6	1/2
C-8	7-10-63	7-19-63	254	27.1	10.8	9.5	10.1	42.6	37.8	40.4	37.0	34.6	35.6	Min.
Current machine average				26.8			10.5			37.5			34.8	
Cumulative machine average				26.7			10.0			37.1			34.2	
Machine factor, %				100.5			105.3			101.1			101.8	
Machine index, %				99.0			103.0			102.6			105.0	

TABLE VI

SUMMARY OF TEST RESULTS FOR MACHINE D

June and July, 1963
(Type of Medium: Semichemical)

D-1	6- 5-63	6-10-63	941	27.6	10.4	9.7	10.1	40.2	30.0	37.6	35.6	32.8	34.2	1-1/2
D-2	6- 5-63	6-10-63	942	27.1	10.7	9.8	10.2	39.0	30.6	35.9	32.4	29.6	30.7	1-1/2
D-3	6-14-63	6-21-63	949	25.4	10.0	9.7	9.8	34.2	32.4	33.5	31.6	29.6	30.7	1-1/2
D-4	6-14-63	6-21-63	950	26.1	10.0	9.1	9.7	40.8	31.8	37.1	32.8	29.8	31.3	1-1/2
D-5	7-10-63	7-15-63	957	27.2	11.0	10.4	10.7	40.2	37.2	38.5	34.6	33.4	34.1	1-1/2
D-6	7-10-63	7-15-63	958	27.2	11.2	10.7	10.8	39.0	31.2	35.6	35.0	31.0	32.9	1-1/2
Current machine average				26.8			10.2			36.4			32.3	
Cumulative machine average				27.1			10.1			37.1			33.2	
Machine factor, %				98.8			101.2			97.9			97.5	
Machine index, %				98.8			100.0			99.4			97.7	

TABLE VII

SUMMARY OF TEST RESULTS FOR MACHINE E

June and July, 1963
(Type of Medium: Semichemical)

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb./M sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
E-1	6-18-63	6-27-63	3760	26.0	10.6	10.0	10.3	36.0	33.0	34.6	32.4	29.6	30.7	1/2
E-2	6-20-63	6-27-63	4090	27.0	11.1	10.1	10.8	37.8	34.8	36.2	33.2	30.4	31.4	1/2
E-3	6-21-63	7- 2-63	4365	26.7	11.0	10.3	10.6	35.4	31.8	33.7	31.4	28.4	29.6	1
E-4	6-22-63	7- 2-63	4684	27.3	10.7	10.1	10.4	37.2	34.2	36.4	33.2	29.4	30.6	1-1/2
Current machine average				26.7			10.5			35.2			30.6	
Cumulative machine average				26.7			10.3			37.2			33.5	
Machine factor, %				100.0			102.7			94.7			91.4	
Machine index, %				98.7			102.8			96.3			92.4	

TABLE VIII

SUMMARY OF TEST RESULTS FOR MACHINE F

June and July, 1963
(Type of Medium: Semichemical)

F-1	5- 3-63	6- 3-63	407	25.7	11.3	10.2	10.8	39.0	32.4	34.9	33.0	28.8	31.4	Min.
F-2	5- 8-63	6- 3-63	408	26.8	11.0	10.1	10.8	40.2	35.4	38.3	36.4	32.6	34.8	1
F-3	5-14-63	6- 3-63	409	25.4	10.9	10.1	10.6	38.4	32.4	35.0	34.2	31.6	32.8	1-1/2
F-4	5-20-63	6- 3-63	410	26.5	11.0	10.2	10.6	41.4	38.4	39.7	37.0	33.8	35.2	1-1/2
F-5	6- 6-63	6-19-63	411	28.2	11.6	11.0	11.3	42.0	38.4	40.6	38.2	36.6	37.5	1-1/2
F-6	6-11-63	6-19-63	412	26.5	11.5	11.0	11.1	37.2	33.0	34.8	35.6	32.4	33.5	1
F-7	6-20-63	7-15-63	413	26.9	11.2	10.4	10.8	43.8	34.2	39.0	36.4	30.8	34.1	1-1/2
F-8	6-24-63	7-15-63	414	26.4	11.0	10.4	10.7	40.8	34.8	37.4	35.4	33.4	34.4	1-1/2
F-9	7- 1-63	7-15-63	415	26.5	11.0	10.2	10.7	39.0	37.2	38.0	38.6	34.8	36.4	1-1/2
Current machine average				26.6			10.8			37.5			34.5	
Cumulative machine average				27.4			10.9			38.9			35.5	
Machine factor, %				97.0			99.2			96.6			97.0	
Machine index, %				98.0			105.7			102.6			104.1	

TABLE IX

SUMMARY OF TEST RESULTS FOR MACHINE G

June and July, 1963
(Type of Medium: Semichemical)

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb./M sq. ft.	Caliper, points Max.	Caliper, points Min.	Caliper, points Av.	Concora Flat Crush, p.s.i. Max.	Concora Flat Crush, p.s.i. Min.	Concora Flat Crush, p.s.i. Av.	Single-Face Flat Crush, p.s.i. Max.	Single-Face Flat Crush, p.s.i. Min.	Single-Face Flat Crush, p.s.i. Av.	Runnability, maximum tension at 600 f.p.m., lb./in.
G-1	6-13-63	6-25-63	--	26.8	10.4	10.0	10.1	39.0	37.2	37.9	35.4	33.4	34.1	1-1/2
G-2	6-14-63	6-25-63	--	27.1	10.4	10.0	10.1	43.8	37.8	40.7	36.4	34.8	35.6	1-1/2
G-3	6-15-63	6-25-63	--	26.5	10.1	9.6	9.9	39.6	36.6	38.2	36.0	34.6	35.1	1-1/2
G-4	6-18-63	6-25-63	--	27.4	10.4	10.1	10.3	40.2	34.8	38.3	35.2	32.4	33.8	1-1/2
G-5	7-12-63	7-25-63	--	26.0	10.0	9.3	9.6	39.6	35.4	37.7	35.2	34.4	34.9	1
G-6	7-13-63	7-25-63	--	26.6	10.3	10.0	10.1	40.2	36.6	37.9	33.4	32.4	32.9	1
G-7	7-16-63	7-25-63	--	26.4	10.0	9.5	9.7	40.8	39.0	40.1	37.4	35.2	36.2	1-1/2
G-8	7-19-63	7-25-63	--	26.6	10.3	10.0	10.1	39.6	36.0	38.2	33.4	31.8	32.6	1-1/2
Current machine average				26.7			10.0			38.6			34.4	
Cumulative machine average				26.8			10.2			36.8			33.4	
Machine factor, %				99.6			97.4			104.9			103.1	
Machine index, %				98.4			97.5			105.5			103.9	

TABLE X

SUMMARY OF TEST RESULTS FOR MACHINE H

June and July, 1963
(Type of Medium: Semichemical)

H-1	5-21-63	5-27-63	355	26.5	11.0	10.3	10.8	42.6	36.0	38.8	38.0	33.6	35.6	1-1/2
H-2	5-29-63	6- 6-63	356	26.0	10.9	10.0	10.4	40.2	37.8	39.1	34.0	32.4	33.1	1-1/2
H-3	7- 2-63	7-12-63	357	26.2	11.0	10.0	10.5	39.6	34.2	38.0	35.6	33.6	34.7	1-1/2
H-4	7-12-63	7-18-63	358	26.1	10.5	9.4	10.0	42.0	34.2	38.3	40.4	34.8	37.2	1-1/2
Current machine average				26.2			10.4			38.6			35.2	
Cumulative machine average				26.5			10.6			38.9			35.4	
Machine factor, %				98.8			98.6			99.0			99.3	
Machine index, %				96.7			101.7			105.4			106.2	

TABLE XI

SUMMARY OF TEST RESULTS FOR MACHINE I

June and July, 1963
(Type of Medium: Kraft)

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb./M sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
I-1	5- 6-63	6- 3-63	9	26.8	9.9	9.0	9.4	37.8	31.2	34.7	29.8	26.4	28.0	Note[a]
I-2	5- 6-63	6- 3-63	10	26.5	10.0	9.0	9.3	38.4	31.8	34.9	31.6	28.0	30.2	Note[b]
I-3	5- 6-63	6- 3-63	11	26.5	9.8	9.0	9.2	36.0	32.4	34.8	36.0	31.6	33.4	Note[b]
I-4	5- 6-63	6- 3-63	12	26.4	9.2	8.9	9.0	35.4	32.4	33.7	35.2	31.8	33.9	Note[c]
I-5	6- 4-63	7- 3-63	13	27.5	9.8	9.2	9.5	34.2	31.2	32.9	30.0	25.2	26.8	Note[c]
I-6	6- 4-63	7- 3-63	14	27.4	9.8	9.0	9.5	34.8	29.4	33.1	29.4	25.4	27.9	Note[c]
I-7	6- 4-63	7- 3-63	15	27.4	9.8	9.0	9.4	33.0	28.8	31.7	29.4	24.4	26.0	Note[c]
I-8	6- 4-63	7- 3-63	16	27.4	9.9	9.1	9.5	34.8	32.4	33.7	25.6	23.2	23.8	Note[c]
I-9	7-17-63	7-23-63	17	27.4	9.9	8.9	9.2	37.2	35.4	36.4	33.6	32.6	33.4	1/2
I-10	7-17-63	7-23-63	18	27.7	9.3	8.8	9.1	40.8	36.6	38.3	34.4	32.2	33.3	1/2
I-11	7-17-63	7-23-63	19	27.1	9.3	8.9	9.1	39.0	35.4	37.1	32.0	31.0	31.6	1
I-12	7-17-63	7-23-63	20	26.8	9.5	8.8	9.1	39.0	34.8	37.3	33.4	31.0	32.5	1/2
Current machine average				27.1			9.3			34.9			30.1	
Cumulative machine average				27.8			9.8			36.0			34.1	
Machine factor, %				97.5			94.7			96.9			88.2	
Machine index, %				100.0			90.5			95.3			90.8	

[a] Maximum speed at which this roll could be corrugated with minimum tension was 425 f.p.m.

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

[c] Maximum speed at which this roll could be corrugated with minimum tension was 450 f.p.m.

TABLE XII

SUMMARY OF TEST RESULTS FOR MACHINE J

June and July, 1963
(Type of Medium: Semichemical)

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb./M sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
J-1	5-27-63	6-10-63	68	26.0	10.0	9.0	9.4	37.2	28.8	34.4	32.0	30.6	31.3	1-1/2
J-2	5-31-63	6-11-63	69	25.7	9.7	9.0	9.4	34.8	29.4	33.2	33.2	28.2	30.0	1-1/2
J-3	6-10-63	6-14-63	70	26.3	10.7	9.8	10.2	37.2	33.0	35.0	32.4	30.4	31.0	1
J-4	6-17-63	6-21-63	71	26.1	10.2	9.4	9.8	37.2	31.8	34.7	32.6	31.8	32.1	1-1/2
J-5	6-24-63	7- 1-63	72	27.1	10.7	10.0	10.2	40.2	35.4	37.3	33.4	31.4	32.4	1-1/2
J-6	7- 1-63	7- 8-63	73	25.8	10.0	9.0	9.3	39.6	36.0	37.7	33.4	29.4	31.6	1-1/2
J-7	7- 8-63	7-12-63	74	26.5	9.9	9.0	9.7	39.6	34.8	36.8	35.6	33.6	34.6	1-1/2
J-8	7-17-63	7-23-63	75	26.0	10.3	9.0	9.6	38.4	34.2	35.6	32.6	28.2	30.1	1-1/2
Current machine average				26.2			9.7			35.6			31.6	
Cumulative machine average				26.7			9.8			35.9			31.9	
Machine factor, %				98.0			98.9			99.3			99.3	
Machine index, %				96.5			94.7			97.3			95.6	

TABLE XIII

SUMMARY OF TEST RESULTS FOR MACHINE K

June and July, 1963
(Type of Medium: Semichemical)

K-1	5- 6-63	6-12-63	534	28.4	11.2	10.4	10.8	41.4	37.8	40.2	37.2	34.2	35.1	1/2
K-2	5-24-63	7- 5-63	536	27.6	11.0	10.2	10.8	42.6	40.2	41.5	37.8	33.6	36.0	Min.
K-3	6-17-63	7- 5-63	537	27.0	10.8	9.8	10.2	41.4	36.0	38.6	35.0	31.6	33.3	Min.
K-4	6-23-63	7-10-63	538	28.4	11.2	10.4	10.8	42.0	39.6	40.9	35.0	32.6	34.0	Min.
K-5	6-29-63	7-15-63	539	26.4	10.3	9.7	10.0	42.0	36.6	39.1	37.6	34.2	35.9	1-1/2
Current machine average				27.5			10.5			40.1			34.8	
Cumulative machine average				27.6			10.5			38.6			34.5	
Machine factor, %				99.9			100.0			103.7			100.9	
Machine index, %				101.6			102.6			109.6			105.2	

TABLE XIV

SUMMARY OF TEST RESULTS FOR MACHINE L

June and July, 1963
(Type of Medium: Semichemical)

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb./M sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m. lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
L-1	5-24-63	6- 3-63	17	27.5	10.9	10.0	10.2	39.0	32.4	34.7	33.8	31.4	32.6	1
L-2	6-13-63	6-21-63	18	26.0	10.0	9.1	9.6	33.6	31.2	32.5	27.4	25.6	26.4	Min.
L-3	7- 2-63	7- 9-63	19	25.5	10.7	10.0	10.3	41.4	36.6	38.4	33.8	31.8	32.6	1-1/2
L-4	7-17-63	7-25-63	20	26.6	10.1	9.6	9.8	34.8	33.0	34.1	33.6	31.0	31.9	1-1/2
Current machine average				26.4			10.0			34.9			30.9	
Cumulative machine average				27.4			10.6			34.3			32.1	
Machine factor, %				96.4			94.7			101.7			96.3	
Machine index, %				97.4			97.7			95.5			93.3	

TABLE XV

SUMMARY OF TEST RESULTS FOR MACHINE M

June and July, 1963
(Type of Medium: Semichemical)

M-1	6-13-63	6-25-63	--	26.9	10.8	10.2	10.4	36.6	32.4	34.2	33.2	29.0	31.2	1/2
M-2	6-14-63	6-25-63	--	26.0	10.4	10.0	10.1	37.2	31.2	33.8	32.4	29.2	31.0	1/2
M-3	6-18-63	6-25-63	--	26.7	10.2	9.6	10.0	42.0	36.0	37.7	34.2	31.6	32.9	1
M-4	6-19-63	6-27-63	--	27.4	11.0	10.2	10.4	40.2	35.4	37.3	35.2	33.4	34.2	1/2
M-5	7-12-63	7-25-63	--	27.2	10.2	9.8	10.0	39.6	35.4	36.8	34.2	31.0	33.1	Min.
M-6	7-13-63	7-25-63	--	27.0	10.1	9.7	9.9	40.2	34.2	36.6	31.8	30.8	31.3	Min.
M-7	7-15-63	7-25-63	--	26.9	10.3	10.0	10.1	38.4	34.2	36.0	33.0	30.8	32.0	1/2
M-8	7-20-63	7-25-63	--	26.9	10.4	10.0	10.2	36.6	34.2	34.8	32.0	29.2	30.5	1/2
Current machine average				26.9			10.2			35.9			32.0	
Cumulative machine average				27.1			10.4			36.8			32.9	
Machine factor, %				99.0			97.3			97.5			97.3	
Machine index, %				99.2			100.0			98.2			96.7	

TABLE XVI

SUMMARY OF TEST RESULTS FOR MACHINE N

June and July, 1963
(Type of Medium: Semichemical)

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb./M sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m. lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
N-1	5-21-63	5-27-63	690	26.5	10.4	9.8	10.1	48.6	39.6	43.2	40.4	38.0	39.2	1-1/2
N-2	5-28-63	6- 3-63	691	26.5	11.0	10.0	10.5	42.6	32.4	39.7	39.6	37.0	38.2	1
N-3	7- 1-63	7-12-63	692	26.0	12.0	10.4	11.1	40.2	32.4	36.4	35.0	33.2	34.0	1-1/2
Current machine average				26.3			10.6			39.8			37.1	
Cumulative machine average				26.6			10.8			40.2			36.1	
Machine factor, %				99.1			98.2			98.9			102.8	
Machine index, %				97.2			103.4			108.7			112.2	

TABLE XVII

SUMMARY OF TEST RESULTS FOR MACHINE O

June and July, 1963
(Type of Medium: Semichemical)

O-1	5-18-63	5-27-63	543	26.0	9.7	9.0	9.4	40.2	36.6	38.5	34.6	33.4	33.8	1/2[a]
O-2	5-19-63	5-29-63	544	26.5	10.0	9.1	9.5	40.8	36.0	38.0	35.6	32.0	33.7	Note[a]
O-3	5-25-63	6-10-63	545	25.8	9.6	9.0	9.2	39.6	37.8	38.6	35.6	32.6	34.1	1/2
O-4	6- 3-63	6-14-63	546	26.3	9.5	9.0	9.2	40.8	34.2	38.2	33.6	31.8	33.0	1/2
O-5	6-17-63	6-21-63	547	26.5	9.4	8.4	9.0	40.2	37.2	39.0	35.2	31.4	33.6	1-1/2
O-6	6-18-63	6-26-63	548	26.3	9.5	8.6	8.9	38.4	31.8	36.1	34.4	30.8	32.4	1/2[a]
O-7	7-12-63	7-22-63	549	26.8	9.4	8.9	9.1	40.8	39.6	40.3	35.4	32.8	33.8	Note[a]
O-8	7-13-63	7-22-63	550	24.9	9.8	8.3	8.8	37.2	32.4	35.3	33.0	29.8	30.8	Note[a]
O-9	7-13-63	7-22-63	551	25.2	9.2	8.4	8.8	38.4	35.4	37.7	32.6	31.6	32.2	Min.
Current machine average				26.0			9.1			38.0			33.0	
Cumulative machine average				26.6			9.2			37.1			32.8	
Machine factor, %				97.7			99.0			102.3			100.8	
Machine index, %				96.0			88.8			103.8			99.8	

[a]Maximum speed at which this roll could be corrugated with minimum tension was 575 f.p.m.

TABLE XVIII

SUMMARY OF TEST RESULTS FOR MACHINE P

June and July, 1963
(Type of Medium: Semichemical)

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb./M sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m. lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
P-1	6- 2-63	6-17-63	234	27.2	11.0	10.0	10.6	39.6	36.0	38.0	35.8	34.0	35.1	1-1/2
P-2	6-12-63	7-15-63	235	27.7	11.6	10.5	11.0	42.6	38.4	39.5	38.4	36.6	37.6	1
P-3	6-16-63	7-15-63	236	26.5	11.4	10.0	10.5	34.8	30.6	33.1	31.2	28.6	30.0	1
P-4	--	7-15-63	237	27.1	10.6	10.0	10.2	34.8	33.6	34.1	33.6	31.2	32.8	1/2
Current machine average				27.1			10.6			36.2			33.9	
Cumulative machine average				26.9			10.3			36.7			32.5	
Machine factor, %				101.0			102.7			98.6			104.3	
Machine index, %				100.0			103.2			98.9			102.4	

TABLE XIX

SUMMARY OF TEST RESULTS FOR MACHINE Q

June and July, 1963
(Type of Medium: Bogus)

Q-1	5- 3-63	5-28-63	175	25.2	9.6	8.2	9.1	34.8	31.2	33.4	33.8	31.0	32.3	1-1/2
Q-2	5-10-63	5-28-63	176	25.8	9.9	8.8	9.3	42.0	32.4	36.2	32.6	30.4	31.4	1-1/2
Q-3	5-18-63	6-11-63	177	28.7	10.6	10.0	10.2	40.8	37.2	38.3	32.6	30.6	31.7	1/2
Q-4	5-21-63	6-11-63	178	27.5	11.0	9.2	10.0	39.0	37.2	38.3	34.6	33.8	34.3	Min.
Q-5	6- 5-63	7-10-63	179	26.5	9.9	8.8	9.4	40.2	37.2	39.4	35.8	30.6	33.8	1-1/2
Q-6	6-12-63	7-10-63	180	26.3	9.7	9.0	9.3	40.2	36.0	38.4	38.4	35.8	36.9	1
Q-7	6-17-63	7-10-63	181	27.1	10.3	9.5	9.9	42.6	37.2	39.8	39.6	35.8	37.7	1-1/2
Q-8	6-22-63	7-10-63	182	26.8	10.0	9.0	9.6	46.2	42.0	43.4	39.4	36.2	37.6	1-1/2
Q-9	7- 1-63	7-22-63	183	26.8	10.4	9.0	9.7	40.8	30.6	35.6	37.4	33.0	34.9	1-1/2
Q-10	7- 6-63	7-22-63	184	27.1	10.3	9.8	10.0	35.4	33.0	34.4	32.4	29.2	30.8	1-1/2
Q-11	7- 6-63	7-22-63	185	26.0	9.9	8.9	9.3	37.2	28.8	33.5	33.8	28.6	31.8	1-1/2
Current machine average				26.7			9.6			37.3			33.9	
Cumulative machine average				27.5			9.7			37.4			33.3	
Machine factor, %				97.1			98.7			99.9			101.8	
Machine index, %				98.5			93.9			102.1			102.5	

TABLE XX

SUMMARY OF TEST RESULTS FOR MACHINE R

June and July, 1963
(Type of Medium: Semichemical)

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb./M sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m. lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
R-1	5-27-63	6- 4-63	939	28.2	11.9	11.1	11.4	37.8	35.4	37.1	35.2	31.6	33.8	1/2
R-2	5-27-63	6- 4-63	940	28.7	11.9	11.0	11.5	37.8	36.0	37.1	33.6	31.6	32.8	1/2
R-3	6-11-63	6-20-63	947	27.6	11.5	10.7	10.9	40.8	34.2	37.1	35.4	32.6	33.8	1/2
R-4	6-11-63	6-20-63	948	27.5	11.0	10.5	10.8	37.8	34.2	36.7	34.0	30.0	32.0	1/2
R-5	6-25-63	7- 8-63	955	27.4	11.3	11.0	11.1	37.8	34.2	35.8	33.8	30.0	31.4	Min.
R-6	6-25-63	7- 8-63	956	27.9	11.9	11.0	11.4	36.6	34.2	35.0	34.0	29.6	31.6	Min.
R-7	7- 8-63	7-17-63	963	28.4	10.9	10.3	10.7	34.8	29.4	32.5	31.8	28.8	30.4	1-1/2
R-8	7- 8-63	7-17-63	964	28.5	10.8	10.1	10.4	37.2	33.6	35.2	33.6	31.2	32.4	1-1/2
Current machine average				28.0			11.0			35.8			32.3	
Cumulative machine average				28.0			10.9			35.4			31.3	
Machine factor, %				100.0			101.4			101.3			103.1	
Machine index, %				103.4			107.7			97.9			97.5	

TABLE XXI

SUMMARY OF TEST RESULTS FOR MACHINE S

June and July, 1963
(Type of Medium: Bogus)

S-1	5-16-63	5-28-63	414	27.6	10.8	9.8	10.4	37.2	34.2	36.1	36.8	34.8	35.7	1
S-2	5-18-63	5-28-63	415	28.2	10.7	10.0	10.4	42.0	37.2	38.5	36.2	31.8	34.7	1/2
Current machine average				27.9			10.4			37.3			35.2	
Cumulative machine average				27.9			10.6			37.4			34.7	
Machine factor, %				100.0			98.4			99.9			101.5	
Machine index, %				102.9			101.4			102.0			106.4	

TABLE XXII

SUMMARY OF TEST RESULTS FOR MACHINE T

June and July, 1963
(Type of Medium: Semichemical)

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb./M sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m. lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
T-1	5-31-63	6-14-63	E-1	24.6	11.0	10.0	10.5	28.2	25.2	26.9	25.0	23.4	24.3	1/2
T-2	5-31-63	6-14-63	E-2	24.6	11.3	9.3	10.5	26.4	24.0	25.3	24.6	21.6	23.6	Min.
T-3	5-31-63	6-14-63	E-3	24.6	11.0	10.0	10.3	28.2	24.6	26.3	25.2	23.2	24.5	Min.
T-4	5-31-63	6-14-63	E-4	24.6	11.0	9.7	10.4	28.8	25.2	26.6	24.6	23.6	24.2	Min.
Current machine average				24.6			10.5			26.3			24.1	
Cumulative machine average				26.8			9.8			32.5			30.1	
Machine factor, %				91.9			106.3			80.9			80.0	
Machine index, %				90.7			102.2			71.8			72.9	

TABLE XXIII

SUMMARY OF TEST RESULTS FOR MACHINE U

June and July, 1963
(Type of Medium: Bogus)

U-1	5- 1-63	5-28-63	172	27.3	10.8	10.0	10.3	36.6	30.6	34.1	32.8	29.6	31.2	1-1/2
U-2	5- 7-63	5-28-63	173	27.5	11.2	9.8	10.3	36.6	31.8	34.6	32.8	30.4	31.8	1-1/2
U-3	5-16-63	6-11-63	174	27.4	10.8	10.0	10.4	38.4	34.2	35.5	30.4	28.4	29.4	1-1/2
U-4	5-21-63	6-11-63	175	27.4	10.8	10.0	10.4	39.0	31.8	34.4	31.6	29.2	31.0	1-1/2
U-5	6- 6-63	7-10-63	176	27.1	10.8	9.1	10.1	35.4	33.0	34.3	32.4	29.6	30.9	1-1/2
U-6	6-13-63	7-10-63	177	26.9	10.0	9.6	9.8	33.6	28.2	31.8	31.8	31.0	31.4	1-1/2
U-7	6-17-63	7-10-63	178	26.8	10.7	9.7	10.2	37.2	32.4	34.8	30.4	27.0	28.8	1-1/2
U-8	6-21-63	7-10-63	179	26.7	11.2	9.7	10.6	39.6	30.0	34.2	31.6	28.4	30.0	1-1/2
U-9	7- 1-63	7-22-63	180	28.3	10.0	9.4	9.8	36.0	28.8	31.8	31.2	28.2	29.8	1-1/2
U-10	7- 6-63	7-22-63	181	29.2	10.3	9.9	10.0	37.8	33.0	35.3	34.0	30.2	32.0	1-1/2
Current machine average				27.4			10.2			34.1			30.6	
Cumulative machine average				28.0			9.8			34.8			31.8	
Machine factor, %				97.9			104.0			98.0			96.3	
Machine index, %				101.3			100.0			93.2			92.5	

TABLE XXIV

SUMMARY OF TEST RESULTS FOR MACHINE V

June and July, 1963
(Type of Medium: Semichemical)

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb./M sq. ft.	Caliper, points Max.	Caliper, points Min.	Caliper, points Av.	Concora Flat Crush, p.s.i. Max.	Concora Flat Crush, p.s.i. Min.	Concora Flat Crush, p.s.i. Av.	Single-Face Flat Crush, p.s.i. Max.	Single-Face Flat Crush, p.s.i. Min.	Single-Face Flat Crush, p.s.i. Av.	Runnability, maximum tension at 600 f.p.m. lb./in.
V-1	5- 2-63	5-31-63	13	26.5	11.0	10.2	10.6	36.0	33.6	34.7	35.2	32.2	33.2	1-1/2
V-2	5- 9-63	5-31-63	14	26.0	10.3	10.0	10.1	35.4	34.2	34.9	35.0	31.6	33.1	1-1/2
V-3	5-13-63	5-31-63	15	25.7	11.0	10.1	10.6	33.6	31.2	32.5	32.4	29.0	30.1	1
V-4	5-21-63	5-31-63	16	27.1	11.9	11.1	11.5	38.4	32.4	35.0	32.8	29.4	30.9	1/2
V-5	6- 7-63	7- 5-63	17	27.1	11.5	11.0	11.1	34.8	34.2	34.4	33.6	29.2	31.5	1-1/2
V-6	6-13-63	7- 5-63	18	27.1	11.8	11.0	11.2	37.8	28.8	33.2	34.2	29.4	32.7	1
V-7	6-20-63	7- 5-63	19	26.0	11.0	10.0	10.3	37.8	31.8	35.5	32.8	28.2	30.9	1/2
V-8	6-26-63	7- 5-63	20	26.1	11.0	10.2	10.6	39.6	29.4	34.3	33.0	29.6	31.0	1/2
Current machine average				26.5			10.8			34.3			31.7	
Cumulative machine average				27.2			10.7			35.5			31.8	
Machine factor, %				97.4			100.6			96.7			99.6	
Machine index, %				97.6			105.0			93.9			95.7	

TABLE XXV

SUMMARY OF TEST RESULTS FOR MACHINE W

June and July, 1963
(Type of Medium: Semichemical)

W-1	4- 1-63	6-19-63	77	28.5	11.0	10.5	10.8	36.0	33.0	34.4	33.4	30.4	31.4	1-1/2
W-2	4- 8-63	6-19-63	79	29.0	10.9	10.0	10.7	36.0	31.2	33.6	33.4	30.8	31.9	1
W-3	4- 8-63	6-14-63	80	27.7	10.8	10.0	10.4	39.0	36.0	37.6	34.2	31.8	32.7	1/2
W-4	5-12-63	6-14-63	81	27.6	10.7	10.0	10.5	41.4	37.2	39.5	37.0	33.8	35.0	1
W-5	6- 3-63	6-14-63	82	27.4	10.9	10.2	10.6	39.0	31.8	34.8	34.2	33.0	33.6	1/2
W-6	6- 3-63	7- 3-63	84	27.1	10.7	10.0	10.2	37.8	34.2	36.4	33.4	30.4	32.3	1/2
W-7	6- 3-63	7- 3-63	85	27.0	10.5	9.9	10.2	39.0	34.2	35.8	31.2	30.0	30.6	1-1/2
Current machine average				27.8			10.5			36.0			32.5	
Cumulative machine average				27.4			10.1			38.8			35.1	
Machine factor, %				101.4			103.9			92.8			92.5	
Machine index, %				102.4			102.2			98.4			98.1	

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 sample lots submitted from a given 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 XXV 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.

DISCUSSION OF RESULTS

Shown below from Table II are the maximum and minimum current machine averages noted for each test during the current period (June and July, 1963); the current machine average is the average of the results obtained on all rolls submitted from a given machine during the current period. Also given for each test is the current F.K.I. average which is determined by averaging the current machine averages for the current period and is indicative of the test level being maintained by the industry as a whole to the extent that the industry is represented by the participating machines:

	Maximum Current Machine Average	Minimum Current Machine Average	Current F.K.I. Average
Basis wt., lb.	28.0	24.6	26.7
Caliper, pt.	11.0	9.1	10.3
Concora flat crush, p.s.i.	40.2	26.3	36.2
Single-face flat crush, p.s.i.	37.1	24.1	32.5

The runnability data for the 158 rolls evaluated during the current period are summarized as follows:

Runnability	Number of Rolls	Percentage of Total Rolls
Less than 600 f.p.m. with minimum tension	11	7.0
600 f.p.m.—minimum tension	20	12.7
600 f.p.m.—1/2 lb. per in. tension	34	21.5
600 f.p.m.—1 lb. per in. tension	21	13.3
600 f.p.m.—1-1/2 lb. per in. tension	72	45.6

In Table XXVI a comparison of Institute and mill Concora flat crush test results obtained on conditioned specimens is given for each machine for the current period. 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.* This affords each participant the opportunity to review and compare the level of agreement for his data with the levels shown for the other participants. Comparisons of this kind are a helpful adjunct to other calibration procedures. Shown in Table XXVI are (1) the Institute and mill Concora averages for each roll included in these comparisons, (2) the difference between the roll average based on Institute data and that based on mill data, (3) the Institute and mill averages based on all rolls included in the comparison, and (4) the difference between these over-all averages.

The Concora flat crush data shown in Table XXVI are summarized in Part I of Table XXVII where for each machine the following information is given: (1) Current machine average 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 that 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 XXVII the average differences given in Part I have been converted to per cent. Comparative data from the previous two reports are also included in Part II of Table XXVII. It may be seen in Part II of Table XXVII that, for the current period, the highest average difference of 29.3% was associated with Machine T and the lowest of 0.5% with Machines K and O.

In Table XXVIII a summary of the agreement between Institute and mill Concora flat crush data is given for the current period. Comparative data from

*Data sheets for supplying this information may be obtained from the Institute.

TABLE XXVI

INSTITUTE AND MILL CONCORA FLAT CRUSH TEST RESULTS ON INDIVIDUAL ROLLS FOR JUNE AND JULY, 1963

Machine A						Machine B						Machine C					
			Concora Flat Crush, p.s.i.						Concora Flat Crush, p.s.i.						Concora Flat Crush, p.s.i.		
Code	Mill Roll No.	Date Made	Institute	Mill	Difference[a]	Code	Mill Roll No.	Date Made	Institute	Mill	Difference[a]	Code	Mill Roll No.	Date Made	Institute	Mill	Difference[a]
A-1	--	6-14-63	38.2	36.5	-1.7	B-1	68	5-27-63	33.5	31.2	-2.3	C-1	135	5- 6-63	36.6	32.5	-4.1
A-2	--	6-18-63	40.7	39.1	-1.6	B-2	69	5-31-63	35.2	32.8	-2.4	C-2	597	5-20-63	35.5	34.8	-0.7
A-3	--	6-20-63	37.7	40.1	+2.4	B-3	70	6-10-63	33.8	31.2	-2.6	C-3	829	5-27-63	36.7	34.3	-2.4
A-4	--	6-23-63	38.9	40.1	+1.2	B-4	71	6-17-63	33.8	31.7	-2.1	C-4	262	6- 9-63	35.6	34.0	-1.6
A-5	--	7-13-63	39.4	37.8	-1.6	B-5	72	6-24-63	34.1	33.2	-0.9	C-5	425	6-14-63	38.9	35.6	-3.3
A-6	--	7-15-63	36.8	34.6	-2.2	B-6	73	7- 1-63	37.3	36.8	-0.5	C-6	770	6-25-63	36.6	33.7	-2.9
A-7	--	7-16-63	37.8	36.6	-1.2	B-7	74	7- 8-63	35.2	35.9	+0.7	C-7	36	7- 2-63	39.8	37.4	-2.4
A-8	--	7-17-63	38.2	36.6	-1.6	B-8	75	7-17-63	34.4	35.2	+0.8	C-8	254	7-10-63	40.4	34.3	-6.1
Current Machine Av.			38.4	37.7	-0.7	Current Machine Av.			34.7	33.5	-1.2	Current Machine Av.			37.5	34.6	-2.9
Machine D						Machine E						Machine F					
D-1	941	6- 5-63	37.6	36.7	-0.9	E-1	3760	6-18-63	34.6	34.9	+0.3	F-1	407	5- 3-63	34.9	37.2	+2.3
D-2	942	6- 5-63	35.9	40.5	+4.6	E-2	4090	6-20-63	36.2	36.5	+0.3	F-2	408	5- 8-63	38.3	40.0	+1.7
D-3	949	6-14-63	33.5	39.1	+5.6	E-3	4365	6-21-63	33.7	38.3	+4.6	F-3	409	5-14-63	35.0	38.9	+3.9
D-4	950	6-14-63	37.1	37.2	+0.1	E-4	4684	6-22-63	36.4	35.3	-1.1	F-4	410	5-20-63	39.7	40.3	+0.6
D-5	957	7-10-63	38.5	34.8	-3.7							F-5	411	6- 6-63	40.6	43.7	+3.1
D-6	958	7-10-63	35.6	35.5	-0.1							F-6	412	6-11-63	34.8	38.9	+4.1
												F-7	413	6-20-63	39.0	37.1	-1.9
												F-8	414	6-24-63	37.4	37.3	-0.1
												F-9	415	7- 1-63	38.0	38.3	+0.3
Current Machine Av.			36.4	37.3	+0.9	Current Machine Av.			35.2	36.2	+1.0	Current Machine Av.			37.5	39.1	+1.6
Machine G						Machine H						Machine I					
G-1	--	6-13-63	37.9	38.3	+0.4	H-1	355	5-21-63	38.8	42.2	+3.4	I-1	9	5- 6-63	34.7	35.3	+0.6
G-2	--	6-14-63	40.7	39.5	-1.2	H-2	356	5-29-63	39.1	37.2	-1.9	I-2	10	5- 6-63	34.9	34.6	-0.3
G-3	--	6-15-63	38.2	37.4	-0.8	H-3	357	7- 2-63	38.0	37.8	-0.2	I-3	11	5- 6-63	34.8	35.5	+0.7
G-4	--	6-18-63	38.3	37.7	-0.6	H-4	358	7-12-63	38.3	38.3	0.0	I-4	12	5- 6-63	33.7	35.4	+1.7
G-5	--	7-12-63	37.7	37.1	-0.6							I-5	13	6- 4-63	32.9	35.6	+2.7
G-6	--	7-13-63	37.9	35.9	-2.0							I-6	14	6- 4-63	33.1	37.2	+4.1
G-7	--	7-16-63	40.1	38.8	-1.3							I-7	15	6- 4-63	31.7	35.0	+3.3
G-8	--	7-19-63	38.2	34.8	-3.4							I-8	16	6- 4-63	33.7	35.0	+1.3
												I-9	17	7-17-63	36.4	38.5	+2.1
												I-10	18	7-17-63	38.3	40.1	+1.8
												I-11	19	7-17-63	37.1	37.0	-0.1
												I-12	20	7-17-63	37.3	38.5	+1.2
Current Machine Av.			38.6	37.4	-1.2	Current Machine Av.			38.6	38.9	+0.3	Current Machine Av.			34.9	36.5	+1.6

[a]This difference is the amount in p.s.i. units by which the mill result is higher or lower than the Institute result.

TABLE XXVI (Continued)

INSTITUTE AND MILL CONCORA FLAT CRUSH TEST RESULTS ON INDIVIDUAL ROLLS FOR JUNE AND JULY, 1963

Machine J

Code	Mill Roll No.	Date Made	Concora Flat Crush, p.s.i. Institute	Mill	Difference[a]
J-1	68	5-27-63	34.4	30.6	-3.8
J-2	69	5-31-63	33.2	31.1	-2.1
J-3	70	6-10-63	35.0	32.5	-2.5
J-4	71	6-17-63	34.7	33.1	-1.6
J-5	72	6-24-63	37.3	34.1	-3.2
J-6	73	7- 1-63	37.7	36.7	-1.0
J-7	74	7- 8-63	36.8	37.9	+1.1
J-8	75	7-17-63	35.6	32.3	-3.3
Current Machine Av.			35.6	33.5	-2.1

Machine K

Code	Mill Roll No.	Date Made	Concora Flat Crush, p.s.i. Institute	Mill	Difference[a]
K-1	534	5- 6-63	40.2	40.8	+0.6
K-2	536	5-24-63	41.5	41.9	+0.4
K-3	537	6-17-63	38.6	38.5	-0.1
K-4	538	6-23-63	40.9	39.2	-1.7
K-5	539	6-29-63	39.1	38.9	-0.2
Current Machine Av.			40.1	39.9	-0.2

Machine L

Code	Mill Roll No.	Date Made	Concora Flat Crush, p.s.i. Institute	Mill	Difference[a]
L-1	17	5-24-63	34.7	32.1	-2.6
L-2	18	6-13-63	32.5	31.1	-1.4
L-3	19	7- 2-63	38.4	37.3	-1.1
L-4	20	7-17-63	34.1	35.4	+1.3
Current Machine Av.			34.9	34.0	-0.9

Machine M

M-1	--	6-13-63	34.2	34.6	+0.4
M-2	--	6-14-63	33.8	34.4	+0.6
M-3	--	6-18-63	37.7	36.4	-1.3
M-4	--	6-19-63	37.3	34.9	-2.4
M-5	--	7-12-63	36.8	36.1	-0.7
M-6	--	7-13-63	36.6	37.4	+0.8
M-7	--	7-15-63	36.0	35.3	-0.7
M-8	--	7-20-63	34.8	34.9	+0.1
Current Machine Av.			35.9	35.5	-0.4

Machine N

N-1	690	5-21-63	43.2	39.4	-3.8
N-2	691	5-28-63	39.7	37.7	-2.0
N-3	692	7- 1-63	36.4	37.8	+1.4
Current Machine Av.			39.8	38.3	-1.5

Machine O

O-1	543	5-18-63	38.5	41.1	+2.6
O-2	544	5-19-63	38.0	38.5	+0.5
O-3	545	5-25-63	38.6	37.8	-0.8
O-4	546	6- 3-63	38.2	40.0	+1.8
O-5	547	6-17-63	39.0	40.9	+1.9
O-7	549	7-12-63	40.3	37.1	-3.2
O-8	550	7-13-63	35.3	34.5	-0.8
O-9	551	7-13-63	37.7	37.2	-0.5
Current Machine Av.			38.2	38.4	+0.2

Machine P

P-1	234	6- 2-63	38.0	40.2	+2.2
P-2	235	6-12-63	39.5	42.8	+3.3
P-3	236	6-16-63	33.1	36.6	+3.5
P-4	237	--	34.1	39.1	+5.0
Current Machine Av.			36.2	39.7	+3.5

Machine R

R-1	939	5-27-63	37.1	33.6	-3.5
R-2	940	5-27-63	37.1	34.7	-2.4
R-3	947	6-11-63	37.1	34.6	-2.5
R-4	948	6-11-63	36.7	36.0	-0.7
R-5	955	6-25-63	35.8	34.7	-1.1
R-6	956	6-25-63	35.0	35.4	+0.4
R-7	963	7- 8-63	32.5	33.7	+1.2
R-8	964	7- 8-63	35.2	34.8	-0.4
Current Machine Av.			35.8	34.7	-1.1

Machine T

T-1	E-1	5-31-63	26.9	32.6	+5.7
T-2	E-2	5-31-63	25.3	34.1	+8.8
T-3	E-3	5-31-63	26.3	35.0	+8.7
T-4	E-4	5-31-63	26.6	34.2	+7.6
Current Machine Av.			26.3	34.0	+7.7

Machine V

V-1	13	5- 2-63	34.7	35.2	+0.5
V-2	14	5- 9-63	34.9	34.0	-0.9
V-3	15	5-13-63	32.5	32.2	-0.3
V-4	16	5-21-63	35.0	30.4	-4.6
V-5	17	6- 7-63	34.4	29.8	-4.6
V-6	18	6-13-63	33.2	32.0	-1.2
V-7	19	6-20-63	35.5	31.9	-3.6
V-8	20	6-26-63	34.3	34.9	+0.6
Current Machine Av.			34.3	32.6	-1.7

TABLE XXVII

PART I: A COMPARATIVE SUMMARY FOR EACH MACHINE OF THE CONCORA 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
Number of Rolls Compared	8	8	8	6	4	9	8	4	12	8	5	4	8	3	8	4	0	8	0	4	0	8	0
Concora Flat Crush, p.s.i.																							
Current Machine Av. (Institute)[a]	38.4	34.7	37.5	36.4	35.2	37.5	38.6	38.6	34.9	35.6	40.1	34.9	35.9	39.8	38.2	36.2	--	35.8	--	26.3	--	34.3	--
Current Machine Av. (Mill)[a]	37.7	33.5	34.6	37.3	36.2	39.1	37.4	38.9	36.5	33.5	39.9	34.0	35.5	38.3	38.4	39.7	--	34.7	--	34.0	--	32.6	--
Average Difference[b]	-0.7	-1.2	-2.9	+0.9	+1.0	+1.6	-1.2	+0.3	+1.6	-2.1	-0.2	-0.9	-0.4	-1.5	+0.2	+3.5	--	-1.1	--	+7.7	--	-1.7	--
Maximum Difference[c]	+2.4	-2.6	-6.1	+5.6	+4.6	+4.1	-3.4	+3.4	+4.1	-3.8	-1.7	-2.6	-2.4	-3.8	-3.2	+5.0	--	-3.5	--	+8.8	--	-4.6	--

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

Average Difference, %[d]																							
Current Report (June and July)	-1.8	-3.5	-7.7	+2.5	+2.8	+4.3	-3.1	+0.8	+4.6	-5.9	-0.5	-2.6	-1.1	-3.8	+0.5	+9.7	--	-3.1	--	+29.3	--	-5.0	--
101st Report (April and May)	-1.8	+3.0	-2.8	-0.8	-2.9	-1.9	-2.4	0.0	+4.9	-0.3	+4.6	-1.8	-1.4	0.0	+7.1	-8.3	--	-1.4	--	+7.3	--	-2.9	--
100th Report (Feb. and Mar.)	+2.3	+7.8	-2.2	-2.0	-2.7	-1.3	+3.2	-3.6	--	+0.8	+4.3	-3.9	+1.9	-1.8	+4.6	--	--	+4.8	--	+3.0	--	-1.9	--

[a] Comparisons based on current machine average include only those rolls for which mill data were submitted.

[b] Average 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 XXVI.

[c] Maximum difference is the greatest difference encountered in comparing Institute and mill test averages for individual rolls. See Table XXVI.

[d] Average difference (per cent) 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.

the previous bimonthly period are also included. The data shown for the current period indicate that agreement between Institute and mill Concora data was good, this observation being based on the fact that nearly 80% of the comparisons were within the ± 5% range. It may be further noted in Table XXVIII that, for the current period, 15.8% of the comparisons of Institute and mill data differed by 1% or less, 31.6% differed by 2.5% or less, and 78.9% differed by 5% or less and 94.7% differed by 10% or less. It may be noted also that agreement at these levels for the current period, although satisfactory, was not as good as the agreement at corresponding levels for the previous period. The maximum difference of 29.3% noted for the current period was appreciably higher than the maximum difference of 8.3% noted for the previous period. A difference of this magnitude undoubtedly reflects a gross difference in procedure or instrument calibration between the mill and Institute.

TABLE XXVIII

SUMMARY OF AGREEMENT BETWEEN INSTITUTE AND MILL
CONCORA FLAT CRUSH DATA

Average percentage Difference Between Institute and Mill Concora Flat Crush Test Results[a]	Percentage of All Machines Included Within the Indicated Range	
	Previous Period[b]	Current Period[c]
± 1.0	21.1	15.8
± 2.5	52.6	31.6
± 5.0	84.2	78.9
±10.0	100.0[d]	94.7
±29.3		100.0

[a] The average obtained at the Institute was used as the reference in the calculation of the percentage differences.

[b] April and May, 1963

[c] June and July, 1963

[d] Maximum percentage difference was 8.3.

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