

**CONTINUOUS EVALUATION OF
CORRUGATING MEDIUM**

Project 1108-17

Report 88

A Progress Report

to

FOURDRINIER KRAFT BOARD INSTITUTE, INC.

June 1, 1961

CODE LETTERS FOR PROGRESS REPORT 88
CONTINUOUS EVALUATION OF CORRUGATING MEDIUM

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

THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

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TABLE OF CONTENTS

ii

	Page
SUMMARY	1
PURPOSE OF THIS STUDY	4
PROCEDURE FOR PARTICIPATING	4
PRESENTATION AND DISCUSSION OF TEST RESULTS OBTAINED AT THE INSTITUTE OF PAPER CHEMISTRY	5
Number of Rolls of Corrugating Medium Submitted for Evaluation from Each Machine	6
Summary of Current MachineAverages for May, 1961 Showing Also the Current and Cumulative F.K.I. Averages	8
Graphical Presentation of Basis Weight and Caliper Data	9
Graphical Presentation of Concora Flat Crush Data and Single-Face Flat Crush Data	10
Summary of Test Results for May, 1961	
Machine A	14
Machine B	14
Machine C	15
Machine D	15
Machine E	16
Machine F	16
Machine G	17
Machine H	17
Machine I	18
Machine J	19
Machine K	19
Machine L	20
Machine M	20
Machine N	21

TABLE OF CONTENTS--CONTINUED

iii

	Page
PRESENTATION AND DISCUSSION OF TEST RESULTS OBTAINED AT THE INSTITUTE OF PAPER CHEMISTRY--Continued	
Summary of Test Results for May, 1961--Continued	
Machine O	21
Machine P	22
Machine Q	22
Machine R	23
Machine S	23
Machine T	24
Machine U	24
DISCUSSION OF CONCORA FLAT CRUSH TEST RESULTS OBTAINED AT THE INSTITUTE OF PAPER CHEMISTRY AND THOSE OBTAINED AT THE MILLS	25
Comparison of Institute and Mill Concora Results on Individual Rolls for May, 1961	26
A Comparative Summary for Each Machine of the Concora Flat Crush Averages Based on Institute Data and Those Based on Mill Data	28
A Tabulation for Each Machine of the Average Difference (per cent) Between the Concora Flat Crush Average Based on Institute Data and That Based on Mill Data (Corresponding Data for the Two Previous Periods are Also Shown)	28
A Comparison by Periods of Agreement Between Institute and Mill Concora Flat Crush Data	30

THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

SUMMARY

The purpose of this study is to provide a continuous evaluation of the quality and runnability of the corrugating mediums manufactured by members of the Fourdrinier Kraft Board Institute. The program is implemented in the following way: Rolls of corrugating medium are submitted on a weekly basis from the production of each machine. Each roll is evaluated for basis weight, caliper, Concora flat crush (conditioned after fluting), and runnability. In addition to the evaluation carried out at the Institute as described above, each participant may, if he so desires, evaluate each roll of corrugating medium for Concora flat crush (conditioned after fluting) and submit the results to The Institute of Paper Chemistry, thus providing an opportunity to include a comparison of Institute and mill Concora flat crush results in the monthly progress reports.

The study, as described in the preceding paragraph, provides several important benefits. For example, it enables each participant to evaluate his quality position in relation to the rest of the industry on a continuing basis. In addition, it provides a basis for comparing Concora flat crush results obtained at the Institute with those obtained at the mills on corresponding rolls of medium.

During the month of May, one hundred and twelve rolls of corrugating medium were submitted to The Institute of Paper Chemistry from the production of twenty-one machines.

Shown below are the maximum and minimum current machine averages noted for each test during May (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 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 weight, lb.	28.9	26.5	27.5
Caliper, pt.	10.8	9.1	10.1
Concora flat crush, p.s.i. (conditioned after fluting)	38.7	31.9	36.3
Single-face flat crush, p.s.i.	37.3	30.3	34.7

The runnability data for the 112 rolls of medium evaluated during May are summarized as follows:

Runnability	Number of Rolls	Percentage of Total Rolls
Less than 600 f.p.m. with minimum tension	3	2.7
600 f.p.m. with minimum tension	8	7.1
600 f.p.m. with tension of 1/2 lb. per in.	14	12.5
600 f.p.m. with tension of 1 lb. per in.	20	17.9
600 f.p.m. with tension of 1-1/2 lb. per in.	67	59.8

Concora flat crush results obtained on specimens conditioned after fluting were submitted for fifteen of the twenty-one machines from which rolls

were received during the current month. The comparisons of Concora flat crush test results based on the average result obtained at the Institute and at the mill for all rolls compared for each machine are summarized below. Shown in this summary is the number of machines (and the percentage of the total machines which they represent) whose Concora test averages fall within the indicated percentage ranges from the results obtained at the Institute on the same rolls.

Average Percentage Difference Between Institute and Mill Concora Flat Crush Test Results ^a	Number of Machines	Percentage of All Machines
<u>±</u> 1.0	3	20.0
<u>±</u> 2.5	7	46.7
<u>±</u> 5.0	11	73.3
<u>±</u> 7.5	13	86.7
<u>±</u> 10.0	14	93.3
<u>±</u> 10.8	15	100.0

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

It may be noted from the comparison given above that agreement between Institute and mill Concora flat crush results was good.

CONTINUOUS EVALUATION OF CORRUGATING MEDIUM

PURPOSE OF THIS STUDY

The purpose of this study is to provide a continuous evaluation of the quality and runnability of corrugating medium produced by members of the Fourdrinier Kraft Board Institute. The study, as it progresses, is accumulating a backlog of data and experience which provides several important benefits. For example, it enables each participant to evaluate his position in relation to the rest of the industry. In addition, it provides background information essential for the judicious interpretation of any proposed specifications on corrugating medium (on either a company or industry basis). The program also provides a basis for comparing Concora results obtained at the Institute with those obtained at the mills on corresponding rolls of medium. This comparison is a helpful adjunct to conventional calibration procedures.

PROCEDURE FOR PARTICIPATING

The procedure for participating in this study involves the submission of six rolls of corrugating medium per month from each machine to The Institute of Paper Chemistry. These rolls are taken from regular production runs on different days. Each roll is 10 to 12 inches wide and contains approximately 5,000 lineal feet of medium (approximately 30 inches in diameter). When received by the Institute, each roll is assigned a code identification. In the monthly reports, each machine is identified by a code letter. A different code letter is used each month in order to mask the identity of the machines.

PRESENTATION AND DISCUSSION OF TEST RESULTS OBTAINED AT
THE INSTITUTE OF PAPER CHEMISTRY

During the month of May, one hundred and twelve rolls of corrugating medium were selected from the production of twenty-one machines and submitted to The Institute of Paper Chemistry for evaluation. A tabulation of the number of rolls submitted from each machine is given in Table I.

Each sample of corrugating medium was evaluated for basis weight, caliper, Concora flat crush (conditioned after fluting), H. and D. flat crush (single-faced board), and runnability. (Concora flat crush results obtained on specimens tested immediately after fluting were included in Progress Reports 45 through 57). 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 (no ruptured flutes). If the medium fabricated satisfactorily at 600 f.p.m. with minimum tension, further runs were made at higher tensions to determine when cracking occurred. The higher tensions used were 0.5 lb. per inch, 1.0 lb. per inch, and 1.5 lb. per inch.

Flat crush was determined on the 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.

TABLE I

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

Machine Code	Number of Rolls
A	4
B	5
C	4
D	4
E	6
F	6
G	12
H	4
I	9
J	5
K	4
L	5
M	4
N	6
O	6
P	6
Q	4
R	4
S	4
T	4
U	6
Total	<u>112</u>

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

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

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

In Table II the current machine averages for the month of May are summarized. It may be noted in Table II and Figure 1 that basis weight varied from a low of 26.5 lb. for Machine B to a high of 28.9 lb. for Machine E. The current F.K.I. average for basis weight was 27.5 lb., which was slightly higher than cumulative F.K.I. average of 27.3 lb. Of the current Machine averages in Table II none were below the 26-lb. minimum requirement of Rule 41. On the basis of individual rolls, it may be noted that the tabulated data for each machine shown in Tables III through XXIII included three basis weight averages which were below 26 lb.

TABLE II

SUMMARY OF CURRENT MACHINE AVERAGES
May, 1961

Code	Basis Weight, lb.	Caliper, points	Concora Flat Crush, p.s.i.	Single-Face Flat Crush, p.s.i.
A	26.7	10.8	37.1	34.6
B	26.5	10.1	33.9	31.5
C	28.2	10.4	36.0	34.2
D	27.8	10.4	36.9	34.8
E	28.9	9.8	35.1	35.8
F	27.1	9.8	36.3	35.0
G	27.8	9.1	38.3	36.0
H	26.7	9.6	36.3	34.4
I	26.9	10.1	37.1	35.7
J	27.4	10.1	37.9	36.2
K	28.4	10.8	34.7	32.8
L	27.5	10.3	37.5	36.8
M	27.5	10.0	38.7	36.2
N	27.8	9.9	36.6	35.1
O	28.6	9.8	31.9	30.3
P	27.0	10.3	38.4	35.3
Q	26.6	10.7	36.7	35.2
R	27.9	10.3	37.8	37.3
S	27.6	10.8	35.7	34.0
T	27.1	9.6	35.6	34.4
U	26.7	9.9	33.7	32.4
Current F.K.I. Average	27.5	10.1	36.3	34.7
Cumulative F.K.I. Average	27.3	10.3	36.4	33.3
F.K.I. Index, %	100.5	98.2	99.8	104.2

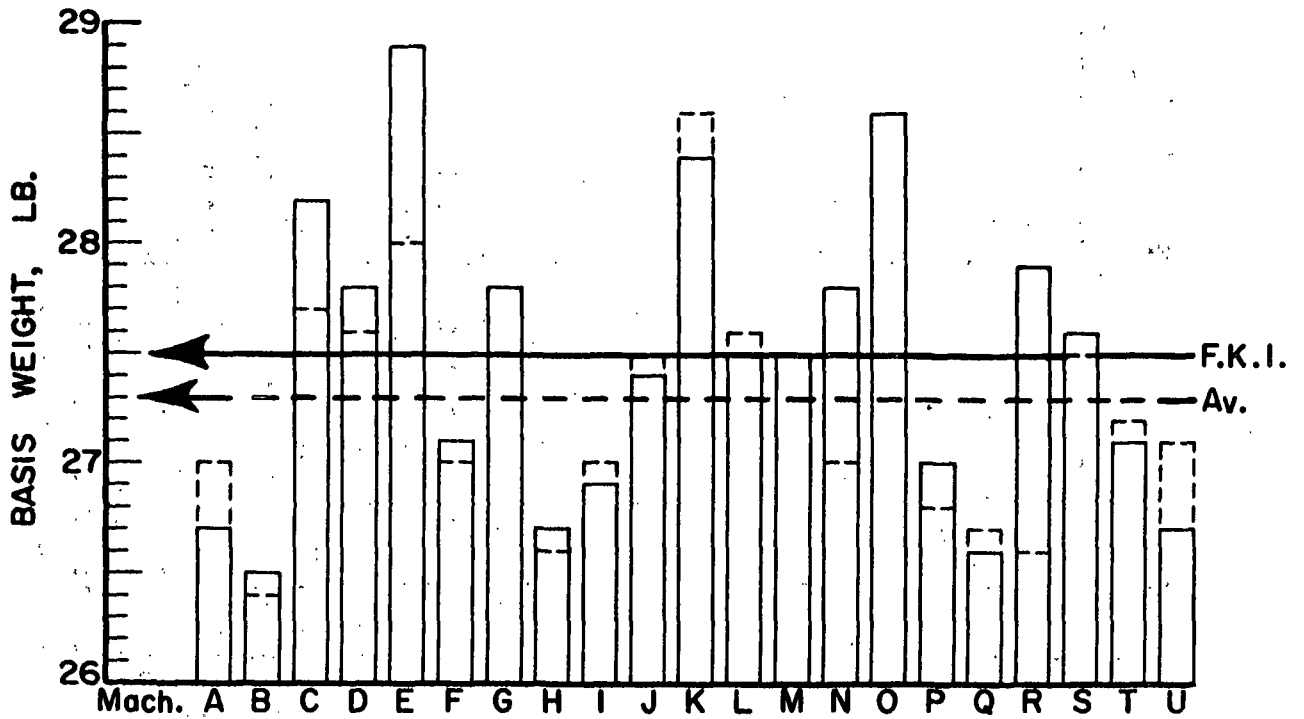


Figure 1. Comparison of Basis Weight Results for May, 1961

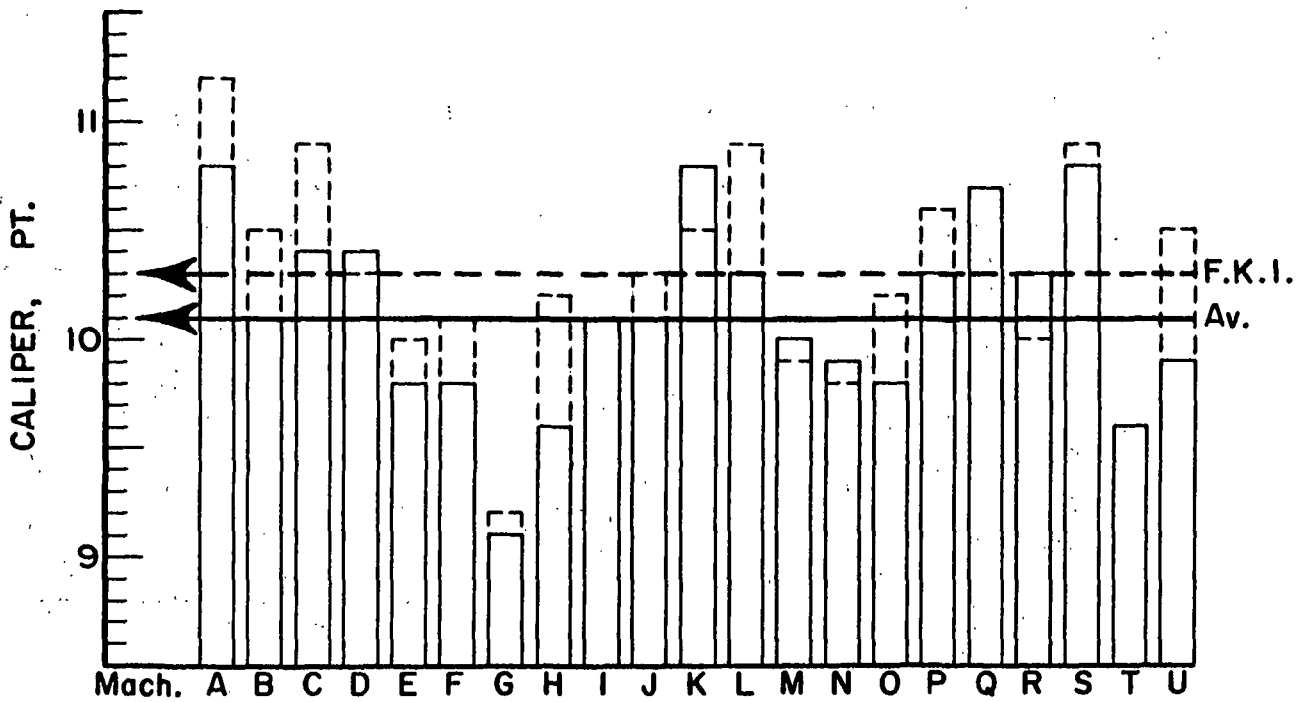


Figure 2. Comparison of Caliper Results for May, 1961

— Current machine average
 - - - Cumulative machine average

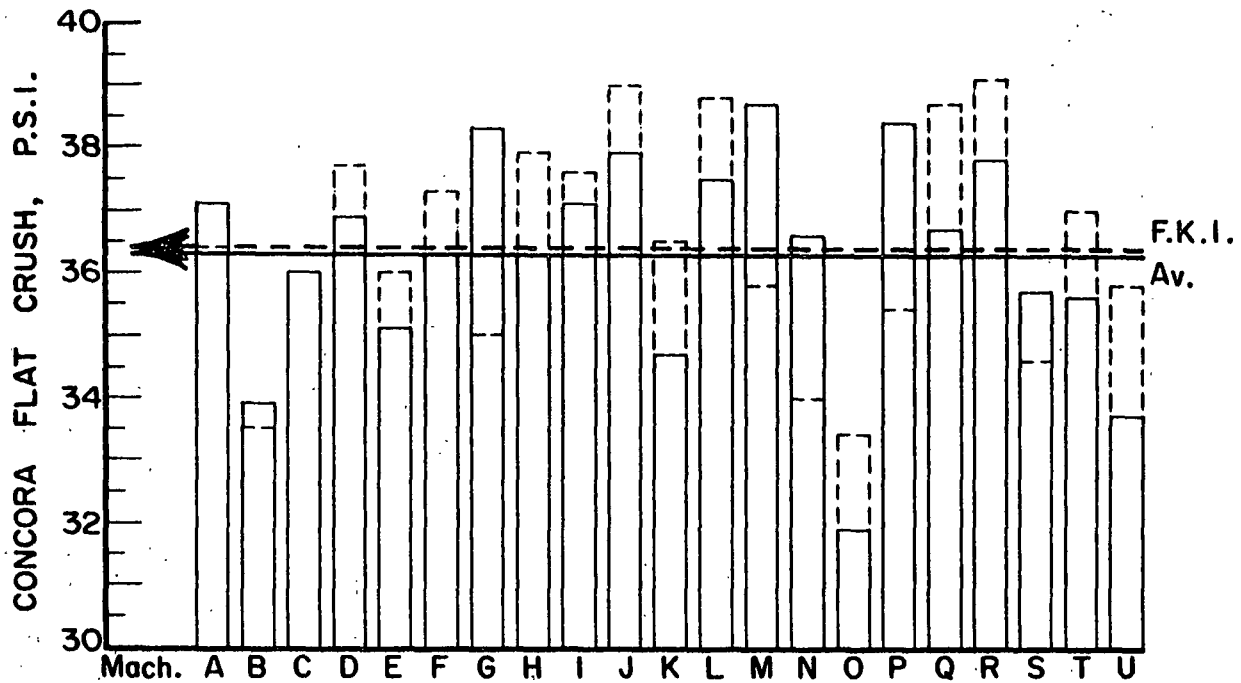


Figure 3. Comparison of Concora Flat Crush Results for May, 1961

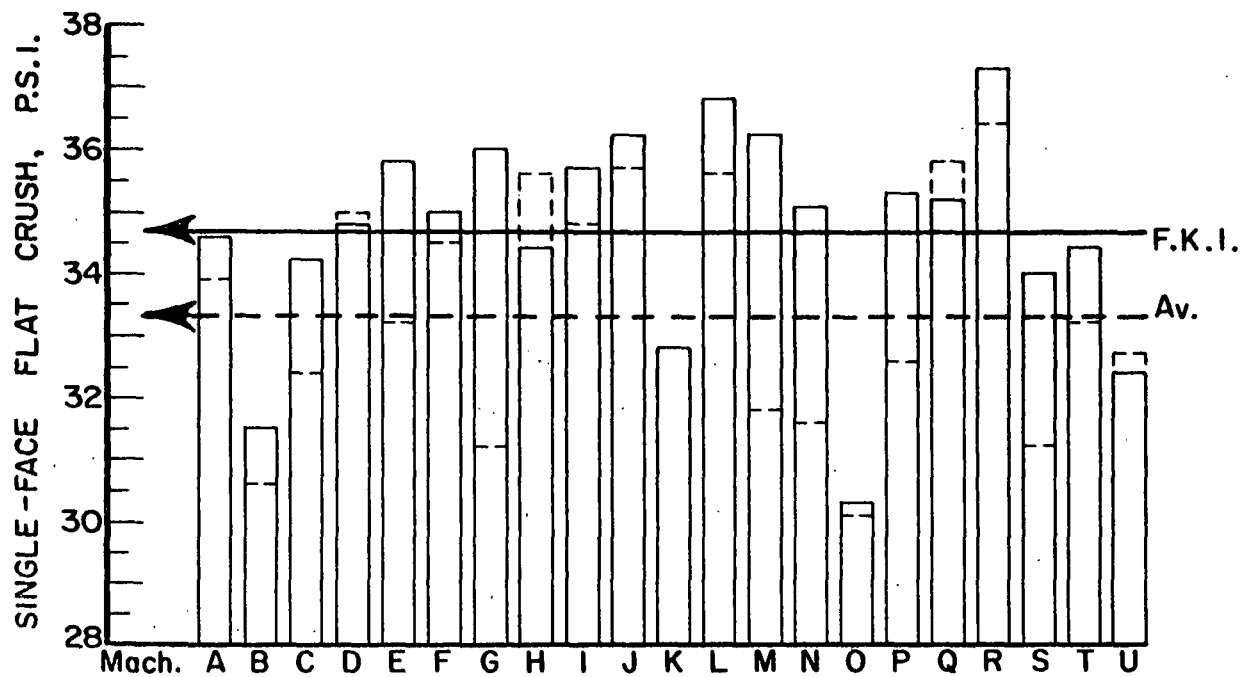


Figure 4. Comparison of Single-Face Flat Crush Results for May, 1961

————— Current machine average
 - - - - - Cumulative machine average

With regard to the caliper results for the current period, it may be seen in Table II and also in Fig. 2 that the lowest current machine average of 9.1 points was associated with Machine G, and the highest average of 10.8 points was associated with Machines A, K, and S. The current F.K.I. average of 10.1 points was slightly lower than the cumulative F.K.I. average of 10.3 points. The minimum caliper requirement of nine points specified in Rule 41 was met by all participants on the basis of the current machine averages shown in Table II. On the basis of individual rolls, there was one caliper average below 9 points.

The Concora flat crush averages are presented graphically in Fig. 3 based on the data given in Table II. An inspection of the Concora flat crush results shown in Table II and Fig. 3 reveals that 38.7 p.s.i. was the highest average and 31.9 p.s.i. the lowest. Machine M had the highest average, whereas Machine O had the lowest average. The current F.K.I. average of 36.3 p.s.i. was slightly lower than the cumulative F.K.I. average of 36.4 p.s.i.

The highest single-face flat crush average of 37.3 p.s.i. was obtained on the medium from Machine R and the lowest of 30.3 p.s.i. on the medium from Machine O. These data are shown in Table II and are presented graphically in Fig. 4. The current F.K.I. average was 34.7 p.s.i., which was higher than the cumulative F.K.I. average of 33.3 p.s.i.

The runnability data for the 112 rolls of medium evaluated during May are summarized as follows:

Runnability	Number of Rolls	Percentage of Total Rolls
Less than 600 f.p.m. with minimum tension	3	2.7
600 f.p.m. with minimum tension	8	7.1
600 f.p.m. with tension of 1/2 lb. per in.	14	12.5
600 f.p.m. with tension of 1 lb. per in.	20	17.9
600 f.p.m. with tension of 1-1/2 lb. per in.	67	59.8

For the month of May, the current F.K.I. averages for basis weight and single-face flat crush were higher than their respective cumulative F.K.I. averages, whereas the current F.K.I. averages for caliper and Concora flat crush were lower than their respective cumulative F.K.I. averages.

The test results obtained on the sample lots submitted from the production of each of the machines are shown in Tables III through XXIII for Machines A through U, respectively. The maximum, minimum, and average test results obtained on each sample lot are shown for all tests except basis weight for which only the average is shown; in addition, the over-all average result for all 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 XXIII are the machine factor and machine index which are defined as follows:

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

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

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

TABLE III
SUMMARY OF TEST RESULTS FOR MACHINE A
May, 1961

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runability, Maximum Tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
A-1	5- 9-61	5-16-61	515	26.9	11.9	10.9	11.4	38.4	34.8	36.7	35.0	33.4	34.0	1
A-2	5- 9-61	5-16-61	516	27.0	11.9	11.0	11.2	40.2	34.8	38.3	38.6	35.8	37.4	1-1/2
A-3	5-18-61	5-24-61	523	26.3	11.5	10.0	10.8	39.0	34.2	36.2	34.2	32.4	33.2	1-1/2
A-4	5-18-61	5-24-61	524	26.5	10.5	9.0	9.8	38.4	34.8	37.3	34.6	33.6	34.0	1-1/2
Current Machine Average				26.7	10.8			37.1			34.6			
Cumulative Machine Average				27.0	11.2			36.4			33.9			
Machine Factor, %				98.9	96.9			102.0			102.3			
Machine Index, %				97.7	104.8			102.1			104.1			

TABLE IV
SUMMARY OF TEST RESULTS FOR MACHINE B
May, 1961

B-1	4-13-61	5-18-61	151	26.6	10.9	9.9	10.1	36.0	33.0	34.8	34.4	31.4	32.5	1/2
B-2	4-23-61	5-18-61	152	27.3	10.9	10.0	10.4	33.6	30.6	32.4	32.0	29.6	30.9	1
B-3	4-29-61	5-18-61	153	25.8	10.3	9.9	10.0	37.2	33.6	34.8	31.2	28.2	30.0	1/2
B-4	5- 1-61	5-18-61	154	26.5	10.1	10.0	10.0	34.8	32.4	34.1	32.4	30.0	31.5	1
B-5	5- 8-61	5-18-61	155	26.3	10.3	10.0	10.1	35.4	31.8	33.2	33.8	31.4	32.5	1/2
Current Machine Average				26.5	10.1			33.9			31.5			
Cumulative Machine Average				26.4	10.5			33.5			30.6			
Machine Factor, %				100.2	96.0			101.0			103.0			
Machine Index, %				96.9	98.1			93.1			94.6			

TABLE V
SUMMARY OF TEST RESULTS FOR MACHINE C
May, 1961

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runability, Maximum Tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
C-1	4-27-61	5- 3-61	511	28.8	11.0	10.5	10.7	39.6	37.2	38.5	34.0	32.2	33.2	1-1/2
C-2	4-27-61	5- 3-61	512	28.4	10.8	10.0	10.6	40.8	31.8	36.7	34.4	32.6	33.6	1-1/2
C-3	5-11-61	5-16-61	519	29.7	10.0	9.0	9.6	37.8	35.4	36.1	39.2	34.6	37.0	1-1/2
C-4	5-11-61	5-15-61	520	26.9	10.9	10.1	10.6	33.6	31.2	32.6	35.0	31.2	33.0	1-1/2
Current Machine Average				28.2	10.4			36.0			34.2			
Cumulative Machine Average				27.7	10.9			36.0			32.4			
Machine Factor, %				101.9	95.2			100.0			105.5			
Machine Index, %				103.1	100.7			99.0			102.7			

TABLE VI
SUMMARY OF TEST RESULTS FOR MACHINE D
May, 1961

D-1	4-11-61	4-28-61	--	27.7	10.4	9.8	10.1	39.0	34.8	36.7	35.4	32.2	34.2	1/2
D-2	4-12-61	4-28-61	--	28.0	10.8	10.1	10.5	39.6	36.0	37.6	37.2	34.0	35.9	Min.
D-3	4-21-61	4-28-61	--	28.4	10.7	10.0	10.4	40.8	36.6	38.9	38.0	35.4	36.3	1/2
D-4	5- 5-61	5-18-61	--	27.0	11.0	10.2	10.7	36.6	32.4	34.4	34.0	31.4	33.0	1/2
Current Machine Average				27.8	10.4			36.9			34.8			
Cumulative Machine Average				27.6	10.3			37.7			35.0			
Machine Factor, %				100.7	100.8			97.8			99.4			
Machine Index, %				101.6	101.1			101.4			104.7			

TABLE VII

SUMMARY OF TEST RESULTS FOR MACHINE E
May, 1961

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runability, Maximum Tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
E-1	5-15-61	5-22-61	77	27.4	10.0	9.0	9.4	33.6	31.8	32.6	32.8	32.0	32.4	1-1/2
E-2	5-15-61	5-22-61	78	28.7	10.0	9.0	9.6	37.2	33.6	35.3	36.6	34.0	35.9	1-1/2
E-3	5-15-61	5-22-61	79	28.7	10.0	9.0	9.7	37.8	35.4	36.6	39.8	36.4	37.8	1-1/2
E-4	5-16-61	5-22-61	80	30.1	11.1	10.2	10.8	39.0	37.2	37.8	39.0	38.6	38.8	1-1/2
E-5	5-16-61	5-22-61	81	29.3	10.1	9.0	9.9	36.6	33.0	34.6	36.2	33.2	34.4	1-1/2
E-6	5-16-61	5-22-61	82	29.0	10.1	9.0	9.7	36.0	30.0	33.7	36.6	34.2	35.4	1-1/2
Current Machine Average				28.9	9.8			35.1			35.8			
Cumulative Machine Average				28.0	10.0			36.0			33.2			
Machine Factor, %				103.2	98.6			97.5			107.6			
Machine Index, %				105.7	95.4			96.5			107.5			

TABLE VIII

SUMMARY OF TEST RESULTS FOR MACHINE F
May, 1961

F-1	4-12-61	4-28-61	--	26.3	9.7	9.4	9.5	36.6	34.8	35.8	36.0	34.8	35.3	1-1/2
F-2	4-14-61	4-28-61	--	27.4	10.3	9.6	9.9	40.2	36.6	38.2	35.6	32.8	34.9	1-1/2
F-3	4-19-61	4-28-61	--	26.6	9.7	9.4	9.6	39.0	35.4	37.2	37.2	34.4	35.7	1-1/2
F-4	5- 3-61	5-18-61	--	27.6	10.1	10.0	10.0	37.2	35.4	36.4	37.8	35.6	36.4	1
F-5	5- 4-61	5-18-61	--	27.6	10.1	9.9	10.0	38.4	34.2	36.0	35.4	32.6	34.0	1-1/2
F-6	5- 9-61	5-18-61	--	27.3	10.2	9.9	10.0	36.6	30.6	34.2	34.8	33.4	33.9	1
Current Machine Average				27.1	9.8			36.3			35.0			
Cumulative Machine Average				27.0	10.1			37.3			34.5			
Machine Factor, %				100.3	97.7			97.2			101.6			
Machine Index, %				99.2	95.5			99.7			105.3			

TABLE IX
SUMMARY OF TEST RESULTS FOR MACHINE G^a
May, 1961

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runability, Maximum Tension at 600 f.p.m., lb./in.	
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.		
G-1	4- 4-61	4-27-61	13	27.9	9.5	8.7	9.0	40.2	37.2	38.5	37.2	33.2	35.2	1-1/2	
G-2	4- 4-61	4-27-61	14	27.7	9.4	8.5	8.9	41.4	35.4	38.4	35.0	31.6	33.7	1-1/2	
G-3	4- 4-61	4-27-61	15	28.0	9.2	8.7	9.0	39.0	36.6	37.7	38.2	33.8	36.1	1-1/2	
G-4	4- 4-61	4-27-61	16	27.8	9.6	8.0	9.0	40.8	36.0	38.3	37.2	34.4	35.3	1-1/2	
G-5	4-25-61	5- 5-61	17	27.9	9.7	9.0	9.3	41.4	38.4	40.1	38.6	36.4	37.6	1-1/2	
G-6	4-25-61	5- 5-61	18	27.3	9.5	8.7	9.1	42.0	35.4	38.5	36.4	33.6	34.8	1	
G-7	4-25-61	5- 5-61	19	27.9	9.7	8.6	9.2	41.4	36.6	39.6	38.8	35.2	37.1	1-1/2	
G-8	4-25-61	5- 5-61	20	27.5	9.5	8.6	9.0	40.2	36.6	38.5	35.4	34.0	34.8	1-1/2	
G-9	5- 2-61	5-15-61	21	27.8	10.0	9.0	9.4	39.6	34.8	37.9	39.4	37.0	38.2	1-1/2	
G-10	5- 2-61	5-15-61	22	27.8	9.3	9.0	9.2	39.6	35.4	37.1	37.6	34.4	35.5	1-1/2	
G-11	5- 2-61	5-15-61	23	27.8	10.0	9.0	9.3	40.2	35.4	37.7	37.4	34.6	36.3	1-1/2	
G-12	5- 2-61	5-15-61	24	27.8	10.0	8.7	9.4	40.2	34.2	37.3	38.2	35.4	37.3	1-1/2	
Current Machine Average				27.8			9.1				38.3			36.0	
Cumulative Machine Average				27.8			9.2				35.0			31.2	
Machine Factor, %				100.0			99.0				109.4			115.5	
Machine Index, %				101.5			88.6				105.3			108.2	

TABLE X
SUMMARY OF TEST RESULTS FOR MACHINE H
May, 1961

H-1	4- 7-61	5- 2-61	197	25.7	9.8	9.1	9.6	39.6	33.6	35.6	35.2	32.0	33.8	Min.	
H-2	4-18-61	5- 2-61	576	27.2	10.0	9.2	9.7	40.8	34.8	37.7	35.8	33.2	34.3	Min.	
H-3	4-19-61	5- 2-61	603	26.8	9.6	9.2	9.4	37.2	33.6	35.4	36.6	32.4	34.8	1/2	
H-4	4-25-61	5- 2-61	816	27.0	9.9	9.4	9.7	39.0	34.2	36.6	36.0	33.8	34.8	Min.	
Current Machine Average				26.7			9.6				36.3			34.4	
Cumulative Machine Average				26.6			10.2				37.9			35.6	
Machine Factor, %				100.5			94.3				95.9			96.8	
Machine Index, %				97.7			93.0				99.9			103.5	

^a Some of these rolls were received too late for inclusion in the previous report.

TABLE XI
SUMMARY OF TEST RESULTS FOR MACHINE I^a
May, 1961

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runability, Maximum Tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
I-1	4-11-61	4-28-61	--	26.6	9.8	9.5	9.7	40.2	36.6	37.7	35.2	33.8	34.4	1
I-2	4-15-61	4-28-61	--	27.1	10.7	9.8	10.3	38.4	36.0	37.3	35.2	32.4	33.6	1
I-3	4-18-61	4-28-61	--	26.9	11.2	10.0	10.5	37.8	31.8	35.4	36.0	33.0	34.6	1/2
I-4	4-19-61	4-28-61	--	28.3	11.0	10.5	10.7	42.0	39.0	40.8	39.4	37.6	38.4	1-1/2
I-5	4-20-61	4-28-61	--	26.9	10.4	9.4	9.8	36.0	33.6	34.7	36.8	34.6	35.4	1-1/2
I-6	4-21-61	4-28-61	--	26.3	10.0	9.2	9.7	37.8	34.8	36.5	35.8	33.6	35.2	1-1/2
I-7	5- 4-61	5-18-61	--	26.5	10.0	9.5	9.8	39.0	33.0	37.0	37.8	35.8	36.8	1
I-8	5- 5-61	5-18-61	--	27.1	10.5	10.0	10.1	38.4	36.6	37.4	37.0	35.4	36.0	1/2
I-9	5-10-61	5-18-61	--	26.8	11.0	10.0	10.4	38.4	36.0	37.2	38.6	34.6	36.8	1
Current Machine Average				26.9	10.1			37.1			35.7			
Cumulative Machine Average				27.0	10.1			37.6			34.8			
Machine Factor, %				99.6	100.0			98.6			102.7			
Machine Index, %				98.6	98.1			102.0			107.2			

^a Some of these rolls arrived too late for inclusion in the previous report.

TABLE XII

SUMMARY OF TEST RESULTS FOR MACHINE J
May, 1961

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runability, Maximum Tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
J-1	4-18-61	4-28-61	442	27.6	10.5	9.8	10.1	39.6	37.8	38.6	39.2	35.0	36.6	1-1/2
J-2	4-20-61	4-28-61	443	27.1	9.7	8.7	9.4	39.0	33.6	36.2	34.6	33.0	33.7	1/2
J-3	4-24-61	5- 9-61	444	28.0	10.9	10.2	10.6	40.2	36.0	37.8	36.2	35.4	35.8	Min.
J-4	5- 6-61	5-16-61	445	26.9	10.9	10.0	10.1	41.4	36.0	38.4	40.4	38.6	39.3	1-1/2
J-5	5- 9-61	5-24-61	446	27.6	10.5	10.0	10.1	42.0	36.6	38.3	36.2	34.6	35.5	1
Current Machine Average				27.4	10.1			37.9			36.2			
Cumulative Machine Average				27.5	10.3			39.0			35.7			
Machine Factor, %				99.8	97.2			97.0			101.2			
Machine Index, %				100.3	97.5			104.1			108.7			

TABLE XIII

SUMMARY OF TEST RESULTS FOR MACHINE K
May, 1961

K-1	5- 2-61	5-10-61	376	28.7	11.3	10.5	10.8	36.0	33.0	34.3	34.6	32.0	33.6	1-1/2
K-2	5- 3-61	5-10-61	377	28.4	11.0	10.1	10.5	39.0	34.2	36.5	36.6	34.0	35.0	1-1/2
K-3	5-11-61	5-23-61	378	28.2	11.0	10.1	10.6	36.0	31.8	34.3	35.6	31.4	33.7	1-1/2
K-4	5-17-61	5-23-61	379	28.5	11.9	10.8	11.2	36.0	30.6	33.7	30.0	27.4	29.0	1-1/2
Current Machine Average				28.4	10.8			34.7			32.8			
Cumulative Machine Average				28.6	10.5			36.5			32.8			
Machine Factor, %				99.4	102.6			95.0			100.0			
Machine Index, %				104.0	104.6			95.4			98.6			

TABLE XIV

SUMMARY OF TEST RESULTS FOR MACHINE L
May, 1961

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runability, Maximum Tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
L-1	4-14-61	5- 8-61	311	29.5	10.3	9.0	10.0	40.2	33.6	37.2	37.6	36.4	36.9	1-1/2
L-2	4-19-61	5- 8-61	312	26.6	10.8	10.0	10.2	39.0	34.2	36.5	39.0	34.8	36.7	1-1/2
L-3	4-27-61	5- 8-61	313	26.8	10.4	9.7	10.1	38.4	36.6	37.7	37.6	36.4	36.9	1-1/2
L-4	5- 1-61	5- 8-61	314	26.6	10.3	9.7	10.0	39.0	34.8	37.0	36.4	34.8	35.7	1-1/2
L-5	5- 2-61	5-10-61	315	28.2	11.8	10.8	11.3	40.2	37.8	39.1	39.6	37.2	38.0	1
Current Machine Average				27.5			10.3			37.5			36.8	
Cumulative Machine Average				27.6			10.9			38.8			35.6	
Machine Factor, %				99.8			94.6			96.7			103.4	
Machine Index, %				100.7			99.9			103.1			110.7	

TABLE XV

SUMMARY OF TEST RESULTS FOR MACHINE M
May, 1961

M-1	5- 2-61	5- 8-61	509	27.1	10.0	9.5	9.8	40.8	36.6	38.9	36.6	33.0	34.8	1-1/2
M-2	5- 2-61	5- 8-61	510	27.1	10.2	9.5	9.8	40.8	36.6	39.1	35.8	33.2	34.4	1-1/2
M-3	5-12-61	5-16-61	517	28.0	10.8	9.9	10.1	42.0	31.2	37.4	39.0	35.4	37.1	1-1/2
M-4	5-12-61	5-16-61	518	27.9	10.5	9.5	10.0	40.8	36.6	39.5	42.2	35.0	38.3	1-1/2
Current Machine Average				27.5			10.0			38.7			36.2	
Cumulative Machine Average				27.5			9.9			35.8			31.8	
Machine Factor, %				100.0			100.9			108.3			113.7	
Machine Index, %				100.6			96.5			106.5			108.7	

TABLE XVI

SUMMARY OF TEST RESULTS FOR MACHINE N
 May, 1961

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runability, Maximum Tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
N-1	4-20-61	5- 9-61	B-5	28.2	10.5	10.0	10.1	37.2	36.6	37.0	37.4	34.6	36.0	1-1/2
N-2	4-20-61	5- 9-61	B-6	27.4	10.1	9.5	9.8	39.6	32.4	36.1	34.2	32.0	33.0	1-1/2
N-3	4-20-61	5- 9-61	B-7	27.6	10.7	9.5	10.0	40.2	33.6	36.2	36.6	33.0	34.7	1-1/2
N-4	4-20-61	5- 9-61	B-8	27.8	10.1	8.8	9.8	39.6	34.8	36.7	36.6	36.0	36.3	1-1/2
N-5	4-20-61	5- 9-61	B-9	28.1	10.0	9.8	10.0	39.0	33.0	36.4	35.8	34.8	35.4	1-1/2
N-6	4-20-61	5- 9-61	B-10	27.9	10.2	9.2	9.8	39.0	35.4	37.0	36.6	34.4	35.4	1-1/2
Current Machine Average				27.8	9.9			36.6			35.1			
Cumulative Machine Average				27.0	9.8			34.0			31.6			
Machine Factor, %				103.2	100.9			107.6			111.0			
Machine Index, %				101.8	96.1			100.5			105.5			

TABLE XVII

SUMMARY OF TEST RESULTS FOR MACHINE O
 May, 1961

O-1	5-10-61	5-22-61	74	28.4	10.0	9.0	9.6	33.6	28.8	31.6	33.4	28.4	30.9	1-1/2
O-2	5-10-61	5-22-61	75	29.0	10.5	9.8	10.1	33.0	30.6	31.6	32.0	28.6	29.8	1-1/2
O-3	5-10-61	5-22-61	76	28.2	10.0	9.2	9.6	33.0	27.6	31.1	31.0	28.6	29.3	1-1/2
O-4	5-11-61	5-22-61	77	28.9	10.9	10.0	10.1	33.6	30.0	32.0	31.8	28.4	30.0	1-1/2
O-5	5-11-61	5-22-61	78	28.7	10.1	9.1	9.9	32.4	30.6	31.8	31.2	28.8	29.8	1-1/2
O-6	5-11-61	5-22-61	79	28.7	10.0	9.1	9.7	35.4	31.8	33.6	33.4	31.4	32.2	1-1/2
Current Machine Average				28.6	9.8			31.9			30.3			
Cumulative Machine Average				28.6	10.2			33.4			30.1			
Machine Factor, %				100.0	96.6			95.6			100.9			
Machine Index, %				104.8	95.2			87.8			91.2			

TABLE XVIII

SUMMARY OF TEST RESULTS FOR MACHINE P
May, 1961

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runability, Maximum Tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
P-1	3-13-61	3-31-61	2128	27.6	11.0	10.4	10.7	43.8	38.4	40.1	39.4	36.0	38.4	1-1/2
P-2	3-16-61	3-31-61	2843	27.2	10.6	10.0	10.2	40.8	39.6	40.1	39.6	36.6	38.3	1-1/2
P-3	3-18-61	3-31-61	3104	26.3	10.0	9.9	10.0	37.8	35.4	36.5	34.0	31.4	32.7	1
P-4	3-19-61	3-31-61	3204	26.6	10.2	10.0	10.0	39.0	37.2	37.7	35.2	33.0	34.0	1-1/2
P-5	3-20-61	3-31-61	3662	26.8	10.7	10.2	10.4	38.4	34.8	37.1	34.0	31.2	32.7	1-1/2
P-6	3-22-61	4-24-61	4033	27.3	10.3	10.0	10.2	40.2	38.4	39.0	37.0	34.6	35.8	1-1/2
Current Machine Average				27.0	10.3			38.4			35.3			
Cumulative Machine Average				26.8	10.6			35.4			32.6			
Machine Factor, %				100.7	96.7			108.5			108.3			
Machine Index, %				98.7	99.5			105.6			106.1			

TABLE XIX

SUMMARY OF TEST RESULTS FOR MACHINE Q
May, 1961

Q-1	4-21-61	4-27-61	623	26.9	11.0	10.5	10.7	39.6	36.6	37.8	37.6	34.4	35.8	1-1/2
Q-2	4-25-61	5-1-61	624	26.4	11.5	10.6	11.1	37.8	35.4	36.7	37.0	35.0	36.0	1
Q-3	5-9-61	5-15-61	625	26.7	10.9	10.0	10.4	38.4	35.4	37.3	37.2	32.0	35.2	1-1/2
Q-4	5-12-61	5-18-61	626	26.3	11.0	10.0	10.6	37.2	33.0	34.8	34.6	32.4	33.6	1-1/2
Current Machine Average				26.6	10.7			36.7			35.2			
Cumulative Machine Average				26.7	10.7			38.7			35.8			
Machine Factor, %				99.3	100.0			94.7			98.2			
Machine Index, %				97.2	103.6			100.8			105.6			

TABLE XX

SUMMARY OF TEST RESULTS FOR MACHINE R
May, 1961

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runability, Maximum Tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
R-1	4-15-61	5- 1-61	23	28.3	11.0	10.2	10.6	40.2	36.6	37.7	39.6	36.0	37.5	1
R-2	4-16-61	5- 1-61	24	27.6	10.2	9.8	10.0	40.2	37.8	38.5	39.0	35.6	37.8	1
R-3	5- 8-61	5-16-61	25	28.4	10.9	10.0	10.2	39.0	36.0	37.8	38.8	36.8	37.8	1-1/2
R-4	5- 9-61	5-16-61	26	27.5	10.9	10.2	10.6	38.4	34.8	37.2	37.0	35.4	36.1	1-1/2
Current Machine Average				27.9	10.3			37.8			37.3			
Cumulative Machine Average				26.6	10.0			39.1			36.4			
Machine Factor, %				104.9	103.2			96.6			102.4			
Machine Index, %				102.2	100.3			103.9			112.1			

TABLE XXI

SUMMARY OF TEST RESULTS FOR MACHINE S
May, 1961

S-1	4-20-61	5- 1-61	505	27.7	10.9	10.4	10.6	37.8	34.8	36.5	35.4	33.8	34.6	1/2
S-2	4-20-61	5- 1-61	506	27.2	10.9	10.4	10.6	36.6	34.2	35.2	35.4	33.8	34.8	1/2
S-3	5- 8-61	5-18-61	513	28.1	11.0	10.8	11.0	37.8	34.8	36.5	35.8	33.6	34.8	1/2
S-4	5- 8-61	5-18-61	514	27.3	11.0	10.8	11.0	36.0	33.0	34.6	32.6	31.2	31.9	1/2
Current Machine Average				27.6	10.8			35.7			34.0			
Cumulative Machine Average				27.5	10.9			34.6			31.2			
Machine Factor, %				100.4	99.2			103.2			108.9			
Machine Index, %				100.8	104.4			98.1			102.2			

TABLE XXII

SUMMARY OF TEST RESULTS FOR MACHINE T
May, 1961

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runability, Maximum Tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
T-1	4-16-61	5-15-61	437	27.4	10.0	9.3	9.7	37.2	34.8	35.9	37.0	34.0	35.2	1
T-2	5- 1-61	5-15-61	438	26.4	9.8	9.3	9.6	36.0	33.0	35.2	36.0	31.6	33.7	Note a
T-3	5- 4-61	5-15-61	439	27.1	9.8	9.2	9.6	35.4	31.8	33.4	33.0	31.0	31.9	Note b
T-4	5-15-61	5-23-61	440	27.4	9.9	9.0	9.4	39.0	36.0	37.9	37.6	36.2	37.0	Min.
Current Machine Average				27.1			9.6			35.6			34.4	
Cumulative Machine Average				27.2			9.6			37.0			33.2	
Machine Factor, %				99.3			100.0			96.2			103.9	
Machine Index, %				99.0			92.6			97.8			103.5	

TABLE XXIII

SUMMARY OF TEST RESULTS FOR MACHINE U
May, 1961

U-1	4-10-61	4-28-61	17	27.5	11.0	9.6	10.2	40.2	33.6	37.2	36.4	33.2	34.9	Min.
U-2	4-18-61	4-28-61	18	27.5	10.9	10.1	10.5	30.0	28.2	29.5	27.0	26.6	26.9	Min.
U-3	4-20-61	5-17-61	19	26.8	11.0	10.0	10.6	34.8	32.4	33.7	32.8	31.0	31.8	Note c
U-4	4-28-61	5-17-61	20	25.7	9.5	9.0	9.1	34.8	28.8	32.2	34.2	32.0	32.8	1
U-5	4-30-61	5-17-61	21	26.5	10.1	9.2	9.9	39.6	36.6	37.9	38.6	34.0	37.2	1
U-6	5- 1-61	5-17-61	22	26.0	9.1	8.8	9.0	33.6	28.8	31.4	32.6	28.4	31.2	1
Current Machine Average				26.7			9.9			33.7			32.4	
Cumulative Machine Average				27.1			10.5			35.8			32.7	
Machine Factor, %				98.4			93.7			94.0			99.2	
Machine Index, %				97.6			95.7			92.5			97.5	

^a Maximum speed at which this roll could be corrugated with minimum tension was 450 f.p.m.

^b Maximum speed at which this roll could be corrugated with minimum tension was 575 f.p.m.

^c Maximum speed at which this roll could be corrugated with minimum tension was 250 f.p.m.

DISCUSSION OF CONCORA FLAT CRUSH TEST RESULTS OBTAINED AT THE
INSTITUTE OF PAPER CHEMISTRY AND THOSE OBTAINED AT THE MILLS

In Table XXIV a comparison of Institute and Mill Concora flat crush test results obtained on conditioned specimens is given for the month of May. These comparisons were initiated in Progress Report 30 and permit interested participants to submit their Concora flat crush test results to The Institute of Paper Chemistry so that comparative results may be included in the monthly reports. Data sheets for supplying this information may be obtained from the Institute. Comparisons of this kind are a helpful adjunct to other calibration procedures. It may be noted in Table XXIV that fifteen of the twenty-one participating machines are included in this comparison of Concora flat crush data. Shown in Table XXIV are the Institute and mill Concora averages for each roll included in this comparison, the difference between the roll average based on Institute data and that based on mill data, the Institute and mill averages based on all rolls included in the comparison, and the difference between these over-all averages.

The Concora flat crush data shown in Table XXIV are summarized in Part I of Table XXV 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

TABLE XXIV

INSTITUTE AND MILL CONCORA FLAT CRUSH TEST RESULTS ON INDIVIDUAL ROLLS FOR MAY, 1961

Machine A						Machine B						Machine C					
Code	Mill Roll No.	Date Made	Concora Flat Crush, p.s.i.			Code	Mill Roll No.	Date Made	Concora Flat Crush, p.s.i.			Code	Mill Roll No.	Date Made	Concora Flat Crush, p.s.i.		
			Institute	Mill	Difference ^a				Institute	Mill	Difference ^a				Institute	Mill	Difference ^a
A-1	515	5-9-61	36.7	40.6	+3.9	B-1	151	4-13-61	34.8	36.2	+1.4	C-1	511	4-27-61	38.5	40.7	+2.2
A-2	516	5-9-61	38.3	39.1	+0.8	B-2	152	4-23-61	32.4	35.4	+3.0	C-2	512	4-27-61	36.7	44.3	+7.6
A-3	523	5-18-61	36.2	40.6	+4.4	B-3	153	4-29-61	34.8	34.8	0.0	C-3	519	5-11-61	36.1	39.1	+3.0
A-4	524	5-18-61	37.3	36.6	-0.7							C-4	520	5-11-61	32.6	35.6	+3.0
Current Machine Av.			37.1	39.2	+2.1	Current Machine Av.			34.0	35.5	+1.5	Current Machine Av.			36.0	39.9	+3.9
Machine D						Machine F						Machine G					
D-1	--	4-11-61	36.7	36.0	-0.7	F-1	--	4-12-61	35.8	37.3	+1.5	G-1	13	4-4-61	38.5	35.9	-2.6
D-2	--	4-12-61	37.6	38.4	+0.8	F-2	--	4-14-61	38.2	36.0	-2.2	G-2	14	4-4-61	38.4	35.0	-3.4
D-3	--	4-21-61	38.9	40.2	+1.3	F-3	--	4-19-61	37.2	37.4	+0.2	G-3	15	4-4-61	37.7	35.6	-2.1
D-4	--	5-5-61	34.4	35.8	+1.4	F-4	--	5-3-61	36.4	37.9	+1.5	G-4	16	4-4-61	38.3	35.4	-2.9
						F-5	--	5-4-61	36.0	37.4	+1.4	G-5	17	4-25-61	40.1	38.4	-1.7
						F-6	--	5-9-61	34.2	35.3	+1.1	G-6	18	4-25-61	38.5	40.1	+1.6
Current Machine Av.			36.9	37.6	+0.7	Current Machine Av.			36.3	36.9	+0.6	Current Machine Av.			38.3	38.6	+0.3
Machine H						Machine I						Machine J					
H-1	197	4-7-61	35.6	35.8	+0.2	I-1	--	4-11-61	37.7	39.7	+2.0	J-1	442	4-18-61	38.6	37.0	-1.6
H-2	576	4-18-61	37.7	38.2	+0.5	I-2	--	4-15-61	37.3	36.0	-1.3	J-2	443	4-20-61	36.2	39.0	+2.8
H-3	603	4-19-61	35.0	36.1	+1.1	I-3	--	4-18-61	35.4	37.8	+2.4	J-3	444	4-24-61	37.8	38.2	+0.4
H-4	816	4-25-61	36.6	36.6	0.0	I-4	--	4-19-61	40.8	40.7	-0.1	J-4	445	5-6-61	38.4	39.2	+0.8
						I-5	--	4-20-61	34.7	38.8	+4.1	J-5	446	5-9-61	38.3	37.6	-0.7
						I-6	--	4-21-61	36.5	37.4	+0.9						
						I-7	--	5-4-61	37.0	39.0	+2.0						
						I-8	--	5-5-61	37.4	36.2	-1.2						
						I-9	--	5-10-61	37.2	38.3	+1.1						
Current Machine Av.			36.3	36.7	+0.4	Current Machine Av.			37.1	38.2	+1.1	Current Machine Av.			37.9	38.2	+0.3

^aThis difference is the amount in p.s.i. units by which the mill result is higher or lower than the Institute result.

TABLE XXIV--Continued

INSTITUTE AND MILL CONCORA FLAT CRUSH TEST RESULTS ON INDIVIDUAL ROLLS FOR MAY, 1961

Machine L						Machine M						Machine P					
Code	Mill	Date	Concora Flat Crush, p.s.i.			Code	Mill	Date	Concora Flat Crush, p.s.i.			Code	Mill	Date	Concora Flat Crush, p.s.i.		
	Roll No.		Institute	Mill	Difference ^a		Roll No.		Institute	Mill	Difference ^a		Roll No.		Institute	Mill	Difference ^a
L-1	311	4-14-61	37.2	39.4	+2.2	M-1	509	5- 2-61	38.9	37.8	-1.1	P-1	2128	3-13-61	40.1	39.1	-1.0
L-2	312	4-19-61	36.5	35.5	-1.0	M-2	510	5- 2-61	39.1	39.9	+0.8	P-2	2843	3-16-61	40.1	39.1	-1.0
L-3	313	4-27-61	37.7	35.2	-2.5	M-3	517	5-12-61	37.4	35.8	-1.6	P-3	3104	3-18-61	36.5	37.7	+1.2
L-4	314	5- 1-61	37.0	38.0	+1.0	M-4	518	5-12-61	39.5	39.1	-0.4	P-4	3204	3-19-61	37.7	36.2	-1.5
L-5	315	5- 2-61	39.1	40.6	+1.5							P-5	3662	3-20-61	37.1	34.6	-2.5
Current Machine Av.			37.5	37.7	+0.2	Current Machine Av.			38.7	38.2	-0.5	Current Machine Av.			38.4	37.4	-1.0
Machine Q						Machine S						Machine T					
Q-1	623	4-21-61	37.8	40.0	+2.2	S-1	505	4-20-61	36.5	32.2	-4.3	T-1	437	4-16-61	35.9	36.5	+0.6
Q-2	624	4-25-61	36.7	38.6	+1.9	S-2	506	4-20-61	35.2	34.7	-0.5	T-2	438	5- 1-61	35.2	38.8	+3.6
Q-3	625	5- 9-61	37.3	39.2	+1.9	S-3	513	5- 8-61	36.5	33.6	-2.9	T-3	439	5- 4-61	33.4	35.6	+2.2
Q-4	626	5-12-61	34.8	38.3	+3.5	S-4	514	5- 8-61	34.6	30.7	-3.9	T-4	440	5-15-61	37.9	37.5	-0.4
Current Machine Av.			36.7	39.0	+2.3	Current Machine Av.			35.7	32.8	-2.9	Current Machine Av.			35.6	37.1	+1.5

^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 XXV

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
Number of Rolls Compared	4	3	4	4	0	6	12	4	9	5	0	5	4	0	0	6	4	0	4	4	0
Concora Flat Crush, p.s.i.																					
Current Machine Av. (Institute) ^a	37.1	34.0	36.0	36.9	--	36.3	38.3	36.3	37.1	37.9	--	37.5	38.7	--	--	38.4	36.7	--	35.7	35.6	--
Current Machine Av. (Mill) ^a	39.2	35.5	39.9	37.6	--	36.9	38.6	36.7	38.2	38.2	--	37.7	38.2	--	--	37.4	39.0	--	32.8	37.1	--
Average Difference ^b	+2.1	+1.5	+3.9	+0.7	--	+0.6	+0.3	+0.4	+1.1	+0.3	--	+0.2	-0.5	--	--	-1.0	+2.3	--	-2.9	+1.5	--
Maximum Difference ^c	+4.4	+3.0	+7.6	+1.4	--	-2.2	+3.7	+1.1	+4.1	+2.8	--	-2.5	-1.6	--	--	-2.5	+3.5	--	-4.3	+3.6	--

PART II: A TABULATION FOR EACH MACHINE OF THE AVERAGE DIFFERENCE (PER CENT) BETWEEN THE CONCORA FLAT CRUSH AVERAGE 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
Current Report (May)	+5.7	+4.4	+10.8	+1.9	--	+1.7	+0.8	+1.1	+3.0	+0.8	--	+0.5	-1.3	--	--	-2.6	+6.3	--	-8.1	+4.2	--
87th Report (April)	+1.3	+2.0	-0.8	-0.5	--	-0.8	--	+2.5	+4.3	+1.0	--	-3.4	+0.3	--	--	+0.3	+3.7	--	-14.9	-0.6	--
86th Report (March)	+1.1	+4.8	+11.9	+1.1	--	+7.2	+2.3	+3.6	+3.8	-0.8	--	-1.7	+3.1	--	--	+2.2	+2.4	--	-3.4	+5.2	--

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

Part II of Table XXV the average difference of Part I has been converted to per cent by dividing it by the Institute average and multiplying the result by 100. The average differences in per cent for the current report and the two preceding reports are shown. It may be seen that, for the current period, the highest average difference of 10.8% was associated with Machine C and the lowest of 0.5% with Machine L. An average difference in excess of five per cent was noted for Machines A, C, Q, and S.

In Table XXVI a comparison of the agreement between Institute and mill Concora flat crush data is given for the months of March, April, and May, 1961. An inspection of the percentages shown in Table XXVI indicates that agreement between Institute and mill Concora flat crush data for the current period is, on the whole, better than the agreement obtained in March but somewhat poorer than that obtained in April. It may be noted in Table XXVI that, for the current period (May), almost half (46.7%) of the machines were associated with Concora flat crush results which differed from the results obtained at the Institute by 2.5% or less. In general, agreement between Institute and mill results was good.

TABLE XXVI

COMPARISON BY PERIODS 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		
	March	April	May
<u>± 1.0</u>	6.7	50.0	20.0
<u>± 2.5</u>	46.7	71.4	46.7
<u>± 5.0</u>	80.0	92.9	73.3
<u>+10.0</u>	93.3	92.9	93.3
<u>+14.9</u>	100.0 ^b	100.0	100.0 ^c

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

^b Maximum percentage difference was 11.9.

^c Maximum percentage difference was 10.8.

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