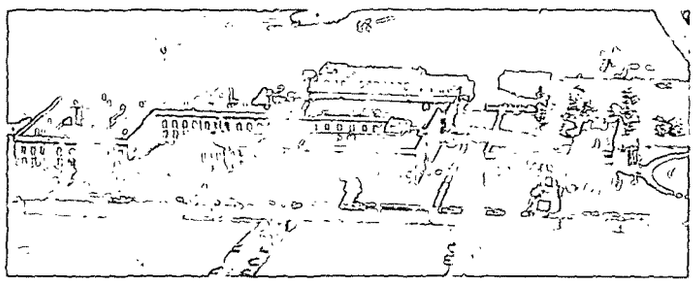
BASE-LINE
MARCH-APRIL, 1976



THE INSTITUTE OF PAPER CHEMISTRY, APPLETON, WISCONSIN

CONTINUOUS BASE-LINE STUDY (MODIFIED)
(MILL CORRUGATING MEDIUM DATA FOR MARCH AND APRIL, 1976)

Project 2694-2

Report Twenty

A Progress Report

to

FOURDRINIER KRAFT BOARD INSTITUTE, INC.

June 23, 1976

BASE-LINE
MARCH-APRIL, 1976

THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

CONTINUOUS BASE-LINE STUDY (MODIFIED)
(MILL CORRUGATING MEDIUM DATA FOR MARCH AND APRIL, 1976)

Project 2694-2

Report Twenty

A Progress Report

to

FOURDRINIER KRAFT BOARD INSTITUTE, INC.

June 23, 1976

TABLE OF CONTENTS

SUMMARY OF 26-LB CORRUGATING MEDIUM DATA
(JANUARY-APRIL, 1976)

Test		January		February		March		April	
		Total	Recycled	Total	Recycled	Total	Recycled	Total	Recycled
Moisture content, %	Max.[a]	9.1	7.3	9.3	6.9	9.3	6.9	9.3	6.5
	Min.[a]	3.7	3.7	3.9	3.9	5.3	4.4	5.2	4.3
	Av.[b]	6.3(33)	5.9(9)	6.3(34)	5.9(10)	6.3(28)	5.9(8)	6.4(29)	5.8(7)
Adj. basis weight, lb/M ft^2	Max.[a]	27.7	27.0	27.5	27.1	27.4	27.3	27.6	26.9
	Min.[a]	25.8	26.1	25.8	25.9	25.7	26.2	25.7	26.2
	Av.[b]	26.5(33)	26.4(9)	26.4(34)	26.4(10)	26.4(28)	26.6(8)	26.4(29)	26.6(7)
Caliper, pt.	Max.[a]	11.8	11.8	11.6	11.6	11.7	10.0	11.3	10.0
	Min.[a]	8.8	9.0	8.4	8.4	8.6	8.5	8.7	8.8
	Av.[b]	10.0(32)	9.7(9)	9.9(33)	9.6(10)	9.9(27)	9.2(8)	9.9(28)	9.1(7)
Concora, psi	Max.[a]	47.7	41.9	45.7	42.7	45.4	42.2	45.2	40.2
	Min.[a]	34.7	34.7	34.6	34.8	34.0	34.8	33.8	34.8
	Av.[b]	39.1(33)	37.8(9)	38.6(34)	37.8(10)	38.5(28)	37.9(8)	38.8(29)	37.3(7)

[a] Current machine average.
[b] Current F.K.I. average, number of machines is indicated in parentheses.

INTRODUCTION

The continuous-base line study (modified) is a compilation of monthly averages of mill test data obtained routinely on 26-lb corrugating medium manufactured in the members mills of F.K.B.I., Inc. Mill data are included for moisture content, basis weight, caliper, and Concora made on the production of individual machines which produced at least 500 tons of this grade weight during a given month.

PRESENTATION OF DATA

For the 26-lb grade weight of corrugating medium referred to earlier, data on conditioning and testing environments, mill test averages for moisture content, adjusted basis weight, caliper, and Concora results are compiled in the following tables.

Table Number	Description
I	Data on Conditioning and Testing Environments
II-III	Mill Test Averages on 26-Lb Corrugating Medium

The procedures used in calculating cumulative machine averages, machine factors, machine indexes, and F.K.I. indexes are described in the Appendix.

It should be explained that the number of machines for which data are compiled in each table for a specified month varies for these reasons: a machine must have (a) produced at least 500 tons of 26-lb corrugating medium during the specified month, or (b) produced 500 tons of 26-lb corrugating medium during <u>any one or more</u> of the 12 months prior to the specified month (so that a cumulative average is available), to be included in a given table.

TABLE I

DATA ON CONDITIONING AND TESTING ENVIRONMENTS

MARCH AND APRIL, 1976

	Conditioning Environment				Testing Environment
	Are Quality Samples	Procedure			Are Quality Samples Tested
Code	Conditioned Before Testing?	Time	Temp., °F	RH, %	Under Controlled Conditions of Temperature and Humidity?
A1	No	--	--	--	No
B1	No	--	--	--	Yes: 73 ± 3°F; 50 ± 2% RH
C1	No	--	--	--	Yes: 72 ± 1°F; 50 ± 2% RH
D1	Yes	20 Min	--	--	Yes: 73 ± 2°F; 50 ± 2% RH
E1	No	--	--	--	No
F1	No	--	--	--	No
G1	No	--	--	--	No
H1	No	--	--	--	No
I1	No	--	--	--	No
J1	No	--	--	--	Yes: 73 ± 2°F; 50 ± 5% RH
K1	No	--	--	--	Yes: 73 ± 2°F; 50 ± 2% RH
L1	No	--	--	--	No
M1	No	--	--	--	Yes: 72 ± 2°F; 50 ± 3% RH
N1	No	--	--	--	Yes: 72 ± 2°F; 50 ± 2% RH
O1	No	--	--	--	Yes: 73 ± 2°F; 50 ± 2% RH
P1	No	--	--	--	No
Q1	Yes	20 Min	--	--	Yes: 72 ± 2°F; 50 ± 2% RH
R1	No	--	--	--	Yes: 73 ± 1°F; 50 ± 2% RH
S1	No	--	--	--	No
T1	No	--	--	--	No
U1	No	--	--	--	Yes: 72 ± 1°F; 50 ± 2% RH
V1	No	--	--	--	No
W1	No	--	--	--	Yes: 73 ± 3.5°F; 50 ± 2% RH
X1	Yes	--	--	--	Yes: 73 ± 2°F; 50 ± 5% RH
Y1	No	--	--	--	No
Z1	No	--	--	--	Yes: 72 ± 2°F; 50 ± 5% RH
A2	Yes	--	73	50	Yes: 73°F; 50 ± 2% RH
B2	No	--	--	--	No
C2	No	--	--	--	No
D2	No	--	--	--	No
E2	No	--	--	--	No
F2	No	--	--	--	No
G2	No	--	--	--	No
H2	No	--	--	--	No
I2	No	--	--	--	No
J2	No	--	--	--	No
K2	No	--	--	--	Yes: 73 ± 1°F; 50 ± 2% RH
L2	No	--	--	--	Yes: 73 ± 2°F; 50 ± 2% RH

TABLE II

AVERAGES OF ROUTINE MILL QUALITY CONTROL DATA FOR 26 LB. CORRUGATING MEDIUM

MARCH, 1976

	MOISTURE CONTENT, PERCENT				ADJ. BASIS WT.,*A LB./ M SQ. FT.				CALIPER, PT.				CONCORA TEST, P.S.I.			
	MACHINE DATA				MACHINE DATA				MACHINE DATA				MACHINE DATA			
CODE *E	CUR. AV.	CUM. AV.	FACT. *B	IND. *C	CUR. AV.	CUM. AV.	FACT. *B	IND. *C	CUR. AV.	CUM. AV.	FACT. *B	IND. *C	CUR. AV.	CUM. AV.	FACT. *B	IND. *C
A1	5.8	6.1	95.1	93.0	26.4	26.4	100.0	99.8	11.7	11.7	100.0	117.3	36.6	36.5	100.3	94.3
B1	6.4	6.1	104.9	102.7	26.2	26.3	99.6	99.0	10.3	9.7	106.2	103.2	41.2	42.0	98.1	106.1
C1																
D1	5.9	5.9	100.0	94.6	27.4	27.2	100.7	103.6	9.6	9.9	97.0	96.2	39.2	37.7	104.0	101.0
E1	6.6	6.0	110.0	105.9	26.3	26.6	98.9	99.4	9.9	9.8	101.0	99.2	40.8	39.4	103.6	105.1
F1	6.2	6.3	98.4	99.5	26.3	26.5	99.2	99.4	9.7	9.4	103.2	97.2	45.4	46.4	97.8	117.0
G1	6.3	6.8	92.6	101.1	26.5	27.4	96.7	100.2	8.6	10.0	86.0	86.2	40.1	44.3	90.5	103.3
H1	6.2	6.6	93.9	99.5	26.1	26.0	100.4	98.6	10.5	10.8	97.2	105.3	39.6	36.7	107.9	102.0
I1	6.9	6.8	101.5	110.7	26.9	26.6	101.1	101.7	9.0	9.8	91.8	90.2	38.4	38.7	99.2	98.9
J1(R)	5.9	5.7	103.5	94.6	26.8	26.4	101.5	101.3	8.5	8.4	101.2	85.2	37.2	38.0	97.9	95.8
K1	7.6	7.0	108.6	121.9	26.0	26.4	98.5	98.3	10.9	10.7	101.9	109.3	35.0	36.6	95.6	90.2
L1(R)	5.5	4.9	112.2	88.2	26.8	27.0	99.2	101.3	9.0	9.0	100.0	90.2	36.5	37.0	98.6	94.0
M1(R)	6.3	6.2	101.6	101.1	27.3	26.4	103.4	103.2	10.0	10.0	100.0	100.2	39.3	39.0	100.8	101.2
N1	6.4	7.1	90.1	102.7	26.7	26.5	100.8	100.9	10.9	11.0	99.1	109.3	38.1	37.8	100.8	98.2
O1	7.4	6.8	108.8	118.7	25.8	26.4	97.7	97.5	10.6	10.5	101.0	106.3	36.0	37.0	97.3	92.7
P1	6.3	6.4	98.4	101.1	26.1	26.2	99.6	98.6	10.4	10.6	98.1	104.3	34.0	35.3	96.3	87.6
Q1	7.1	6.6	107.6	113.9	26.1	26.2	99.6	98.6	10.3	10.0	103.0	103.2	35.8	36.2	98.9	92.2
R1	5.7	5.5	103.6	91.4	26.2	26.2	100.0	99.0	10.7	10.9	98.2	107.3	37.9	38.2	99.2	97.6
S1	6.6	6.2	106.4	105.9	26.3	26.4	99.6	99.4	9.6	9.4	102.1	96.2	35.7	39.1	91.3	92.0
T1(R)	4.4	3.8	115.8	70.6	26.9	27.1	99.3	101.7	9.0	9.0	100.0	90.2	37.2	37.8	98.4	95.8
U1																
V1	6.7	6.6	101.5	107.5	25.8	26.0	99.2	97.5	10.1	10.3	98.0	101.2	40.2	41.1	97.8	103.6
W1	6.1	5.7	107.0	97.9	26.6	26.7	99.6	100.5	8.9	8.9	100.0	89.2	39.7	40.2	98.8	102.3
X1	6.1	6.3	96.8	97.9	26.7	26.6	100.4	100.9	10.4	10.2	102.0	104.3	36.0	37.2	96.8	92.7
Y1	9.3	9.1	102.2	149.2	25.9	25.8	100.4	97.9	10.5	10.7	98.1	105.3	45.0	42.2	106.6	115.9
Z1	6.7	6.7	100.0	107.5	26.5	26.7	99.2	100.2					39.6	42.1	94.1	102.0
A2	5.4	5.2	103.8	86.6	27.0	26.6	101.5	102.0	9.0	9.2	97.8	90.2	39.0	39.7	98.2	100.5
B2	5.9	5.5	107.3	94.6	26.6	26.8	99.2	100.5	10.8	10.8	100.0	108.3	41.2	40.7	101.2	106.1
C2	6.1	5.6	108.9	97.9	26.2	26.2	100.0	99.0	10.1	9.4	107.4	101.2	39.0	39.7	98.2	100.5
D2	5.3	5.4	98.1	85.0	26.3	26.3	100.0	99.4	10.2	10.0	102.0	102.2	37.0	37.9	97.6	95.3
E2	6.6	7.6	86.8	105.9	25.7	26.0	98.8	97.1	11.0	10.7	102.8	110.3	37.7	37.0	101.9	97.1
F2(R)	5.7	4.3	132.6	91.4	26.4	27.0	97.8	99.8	9.0	9.0	100.0	90.2	34.8	35.2	98.9	89.6
G2	6.1	6.1	100.0	97.9	26.3	26.8	98.1	99.4	10.0	10.0	100.0	100.2	40.2	38.9	103.3	103.6
H2(R)	6.5	6.4	101.6	104.3	26.6	26.5	100.4	100.5	9.0	9.1	98.9	90.2	39.6	39.4	100.5	102.0
I2(R)	6.0	6.0	100.0	96.2	26.2	26.3	99.6	99.0	9.0	9.1	98.9	90.2	36.5	37.2	98.1	94.0
J2	6.2	6.1	101.6	99.5	26.4	26.4	100.0	99.8	9.1	9.4	96.8	91.2	38.4	37.1	103.5	98.9
K2(R)	6.9	6.9	100.0	110.7	26.2	26.1	100.4	99.0	9.9	9.9	100.0	99.2	42.2	42.4	99.5	108.7
L2	7.0	6.9	101.4	112.3	26.1	26.5	98.5	98.6	10.4	10.0	104.0	104.3	35.0	37.4	93.6	90.2

FKI DATA	TOTAL	RECYCLED	TOTAL	RECYCLED	TOTAL	RECYCLED	TOTAL	RECYCLED
CUR. AV	6.3	5.9	26.4	26.6	9.9	9.2	38.5	37.9
CUM. AV	6.2	5.9	26.5	26.5	10.0	9.8	38.8	38.0
IND. *D	101.6	100.0	99.8	100.6	99.3	93.9	99.1	99.6

(*)-- NOTES A, B, C, D, AND E, ARE GIVEN IN APPENDIX.

TABLE III

AVERAGES OF ROUTINE MILL QUALITY CONTROL DATA FOR 26 LB. CORRUGATING MEDIUM

APRIL, 1976

	MOISTURE CONTENT, PERCENT				ADJ. BASIS WT.,*A LB./ M SQ. FT.				CALIPER, PT.				CONCORA TEST, P.S.I.			
	MACHINE DATA				MACHINE DATA				MACHINE DATA				MACHINE DATA			
CODE *E	CUR. AV.	CUM. AV.	FACT. *B	IND. *C	CUR. AV.	CUM. AV.	FACT. *B	IND. *C	CUR. AV.	CUM. AV.	FACT. *B	IND. *C	CUR. AV.	CUM. AV.	FACT. *B	IND. *C
A1	5.7	6.1	93.4	91.4	26.3	26.3	100.0	99.4	11.1	11.7	94.9	111.4	36.8	36.5	100.8	94.8
B1	6.4	6.1	104.9	102.7	26.3	26.3	100.0	99.4	10.4	9.8	106.1	104.3	41.4	41.9	98.8	106.6
C1	6.0			96.2	26.4			99.8	10.4			104.3	40.2			103.6
D1		5.9				27.3				9.9				37.9		
E1	6.4	6.0	106.7	102.7	26.4	26.6	99.2	99.8	9.8	9.8	100.0	98.3	41.4	39.5	104.8	106.6
F1	6.5	6.4	101.6	104.3	26.3	26.5	99.2	99.4	9.6	9.4	102.1	96.3	45.2	46.4	97.4	116.4
G1	6.4	6.6	97.0	102.7	27.2	27.1	100.4	102.8	9.4	9.6	97.9	94.3	41.2	42.9	96.0	106.1
H1	6.2	6.2	100.0	99.5	26.1	26.1	100.0	98.6	10.7	10.7	100.0	107.4	40.4	39.0	103.6	104.1
I1	6.7	6.8	98.5	107.5	27.6	26.6	103.8	104.3	9.1	9.8	92.8	91.3	39.0	38.7	100.8	100.5
J1(R)	5.5	5.8	94.8	88.2	26.9	26.6	101.1	101.7	8.8	8.4	104.8	88.3	36.6	37.6	97.3	94.3
K1	7.5	7.0	107.1	120.3	26.0	26.3	98.8	98.3	10.9	10.7	101.9	109.4	35.0	36.3	96.4	90.2
L1(R)	5.8	5.0	116.0	93.0	26.9	27.0	99.6	101.7	9.1	9.0	101.1	91.3	37.0	36.9	100.3	95.3
M1(R)	6.3	6.3	100.0	101.1	26.3	26.7	98.5	99.4	10.0	10.0	100.0	100.3	38.9	39.1	99.5	100.2
N1	6.9	7.0	98.6	110.7	26.6	26.5	100.4	100.5	11.0	11.0	100.0	110.4	37.7	37.9	99.5	97.1
O1	7.3	6.8	107.4	117.1	26.0	26.3	98.8	98.3	10.5	10.5	100.0	105.4	36.0	36.9	97.6	92.7
P1	6.5	6.4	101.6	104.3	26.1	26.2	99.6	98.6	10.5	10.5	100.0	105.4	33.8	35.4	95.5	87.1
Q1	7.3	6.7	109.0	117.1	26.2	26.2	100.0	99.0	10.2	10.0	102.0	102.3	36.2	36.1	100.3	93.2
R1	5.7	5.6	101.8	91.4	26.2	26.2	100.0	99.0	10.8	10.9	99.1	108.4	38.1	38.2	99.7	98.2
S1	6.4	6.2	103.2	102.7	26.4	26.4	100.0	99.8	9.1	9.4	96.8	91.3	36.8	38.8	94.8	94.8
T1(R)	4.3	3.8	113.2	69.0	26.9	27.1	99.3	101.7	9.0	9.0	100.0	90.3	36.7	37.8	97.1	94.5
U1	5.9			94.6	26.6			100.5	10.5			105.4	40.8			105.1
V1	6.7	6.6	101.5	107.5	26.0	26.0	100.0	98.3	9.7	10.2	95.1	97.3	42.0	41.0	102.4	108.2
W1	6.0	5.7	105.3	96.2	26.6	26.7	99.6	100.5	8.9	8.9	100.0	89.3	39.6	40.4	98.0	102.0
X1	6.0	6.3	95.2	96.2	26.6	26.6	100.0	100.5	10.4	10.3	101.0	104.3	38.0	37.1	102.4	97.9
Y1	9.3	9.1	102.2	149.2	25.8	25.8	100.0	97.5	10.6	10.6	100.0	106.4	43.2	42.5	101.6	111.3
Z1	6.7	6.7	100.0	107.5	26.4	26.6	99.2	99.8					40.2	41.5	96.9	103.6
A2	5.9	5.2	113.5	94.6	26.2	26.7	98.1	99.0	8.7	9.1	95.6	87.3	40.0	39.6	101.0	103.0
B2	6.0	5.6	107.1	96.2	26.5	26.8	98.9	100.2	11.3	10.8	104.6	113.4	39.8	40.8	97.5	102.5
C2	6.2	5.6	110.7	99.5	26.2	26.2	100.0	99.0	9.5	9.4	101.1	95.3	39.0	39.6	98.5	100.5
D2	5.2	5.3	98.1	83.4	26.5	26.4	100.4	100.2	9.8	10.0	98.0	98.3	35.9	37.6	95.5	92.5
E2	6.9	7.5	92.0	110.7	25.7	26.0	98.8	97.1	10.7	10.8	99.1	107.4	37.1	37.1	100.0	95.6
F2(R)	5.9	4.5	131.1	94.6	26.4	27.0	97.8	99.8	9.0	9.0	100.0	90.3	34.8	35.1	99.1	89.6
G2	6.2	6.1	101.6	99.5	26.3	26.8	98.1	99.4	10.0	10.0	100.0	100.3	40.2	39.0	103.1	103.6
H2(R)	6.5	6.4	101.6	104.3	26.5	26.5	100.0	100.2	9.0	9.1	98.9	90.3	40.2	39.4	102.0	103.6
I2(R)	6.0	6.0	100.0	96.2	26.2	26.3	99.6	99.0	9.0	9.1	98.9	90.3	37.1	37.0	100.3	95.6
J2		6.1				26.4				9.4				37.2		
K2	6.9	6.9	100.0	110.7	26.2	26.1	100.4	99.0	10.1	9.9	102.0	101.3	42.4	42.3	100.2	109.2
L2	7.1	6.9	102.9	113.9	26.2	26.4	99.2	99.0	10.1	10.1	100.0	101.3	37.0	37.2	99.5	95.3

FKI DATA								
	TOTAL	RECYCLED	TOTAL	RECYCLED	TOTAL	RECYCLED	TOTAL	RECYCLED
CUR. AV	6.4	5.8	26.4	26.6	9.9	9.1	38.8	37.3
CUM. AV	6.2	5.9	26.5	26.5	10.0	9.7	38.8	38.0
IND. *D	102.1	97.9	99.7	100.3	99.7	93.9	99.9	98.3

(*)-- NOTES A, B, C, D, AND E, ARE GIVEN IN APPENDIX.

THE INSTITUTE OF PAPER CHEMISTRY

Terrence S. Fox
Director
Container Division

APPENDIX

NOTES A, B, C, D, AND E, USED IN TABULATIONS OF MILL DATA

Notes A, B, C, D, and E, used in the tables of mill data are given below; these notes define the procedure used in calculating adjusted basis weight, machine factor, machine index, and F.K.I. index. It should be stressed that each formula is applicable only to a specific physical property of a specific grade weight of linerboard.

Note A: Adjusted basis weight (ABW) = reported weight (RBW) adjusted to moisture content of 7.8%:

$$ABW = RBW \left[\frac{(100 - \text{reported moisture content, \%})}{(100 - 7.8)}\right]$$

Note B: Machine factor (%) $= \left[\frac{\text{Current machine average}}{\text{Cumulative machine average}}\right] \cdot 100$ where

$$\text{Cumulative machine average} = \sum \frac{\text{CMA's}^{a} \text{ for previous 12 months excluding CMA for current month}}{12}$$

Note C: Machine index (%) $= \left[\frac{\text{Current machine average}}{\text{Cumulative F.K.I. average}}\right] \cdot 100$ where

$$\text{Cumulative F.K.I. average} = \sum \frac{\text{CFKIA's}^{b} \text{ for previous 12 months excluding CFKIA for current month}}{12}$$

Note D: F.K.I. index (%) $= \left[\frac{\text{Current F.K.I. average}}{\text{Cumulative F.K.I. average}}\right] \cdot 100$ where

$$\text{Current F.K.I. average} = \sum \frac{\text{CMA's}^{a} \text{ for current month for all machines}}{\text{Number of machines}}$$

Note E: (R) — Indicates a medium manufactured from recycled fibers.

---

[a] CMA = current machine average for a specific physical property of 26-lb corrugating medium obtained during a given month on a specific machine.

[b] CFKIA = current F.K.I. average for a specific physical property of 26-lb corrugating medium obtained during a given month.