CHAPTER 4

DATA

Data in this thesis are divided into four parts.

Part 1

Data in this part are consisted of data 1, 2 and 3 which are data from manufacturing toilet tissue on 10th June, 1975. Pulps which are used in this operation are,

50% Coho-k (soft wood bleached kraft pulp)

50% Rottneros (ground wood)

The purpose in analysing the data is to find out the relationship of head box level, MD. breaking length, CD. breaking length, and the ratio of tensile strengths of the tissue paper. The head box level is a variable operating condition while others are set constant. The results are concluded in result 1 and graph 1 in appendix A.

Data 1

Reel No.			1	2	3	Average
Stuff Box	Consistency,%		3.00			3.00
	Freeness	,CSF.	426			426
Head Box	Consistency,%		0.300			0.300
	Temperature,°C		38			38
	pH		7.8			7.8
Speed	Yankee	,FPM.	1450			1450
	Reel	,FPM.	1140			1140
Percent Crepe			27.1			27.1
Head Box Level		,IN.	100			100
Basis Weight		,G./M.^{2}	16.9	17.1	16.7	16.9
MD. Tensile Strength		,G./15MM.	310	316	320	315
CD. Tensile Strength		,G./15MM.	100	108	106	105
Ratio			3.1	2.9	3.0	3.0

Data 2

Reel No.		1	2	3	Average
Stuff Box	Consistency,%	2.84			2.84
	Freeness ,CSF.	425			425
Head Box	Consistency,%	0.298			0.298
	Temperature,°C	38			38
	pH	7.8			7.8
Speed	Yankee ,FPM.	1450			1450
	Reel ,FPM.	1140			1140
Percent Crepe		27.1			27.1
Head Box Level	,IN.	108			108
Basis Weight	,G./M.^{2}	16.8	16.3	16.5	16.5
MD. Tensile Strength	,G./15MM.	306	316	307	310
CD. Tensile Strength	,G./15MM.	112	102	90	101
Ratio		2.7	3.1	3.4	3.1

Data 3

Reel No.			1	2	3	Average
Stuff Box	Consistency, %		2.90			2.90
	Freeness	, CSF.	420			420
Head Box	Consistency, %		0.308			0.308
	Temperature, °C		39			39
	pH		8.0			8.0
Speed	Yankee	, FPM.	1450			1450
	Reel	, FPM.	1140			1140
Percent Crepe			27.1			27.1
Head Box Level		, IN.	115			115
Basis Weight		, G./M.^{2}	16.8	16.6	16.8	16.7
MD. Tensile Strength		, G./15MM.	264	282	274	273
CD. Tensile Strength		, G./15MM.	85	83	83	84
Ratio			3.1	3.4	3.3	3.3

Part 2

Data in this part are consisted of data 4, 5, and 6 which are data from manufacturing toilet tissue on 16th and 30th June, 1975. Pulps which are used in this operation are,

50% Coho-k (soft wood bleached kraft pulp)

50% Rottneros (ground wood)

The purpose in analysing the data is to find out the relationship of Canadian Standard Freeness of stock in the head box, MD. breaking length, CD. breaking length and the ratio of tensile strengths of the tissue paper. The freeness is a variable operating condition while others are set constant. The results are concluded in result 2 and graph 2 in appendix A.

Data 4

Reel No.		1	2	3	4	Average
Stuff Box	Consistency,%	2.66		2.74		2.70
	Freeness ,CSF.	428		418		423
Head Box	Consistency,%	0.338		0.334		0.341
	Temperature,°C	39		39		39
	pH	7.9		8.0		8.0
Speed	Yankee ,FPM.	1450		1450		1450
	Reel ,FPM.	1140		1140		1140
Percent Crepe		27.1		27.1		27.1
Head Box Level	,IN.	114		115		115
Basis Weight	,G./M.^{2}	18.2	17.0	17.1	17.5	17.5
MD. Tensile Strength	,G./15MM.	279	251	255	250	259
CD. Tensile Strength	,G./15MM.	75	67	67	65	69
Ratio		3.7	3.7	3.8	3.8	3.8

Data5

Reel No.		1	2	3	4	Average
Stuff Box	Consistency,%	2.74		2.80		2.77
	Freeness ,CSF.	359		366		363
Head Box	Consistency,%	0.350		0.338		0.344
	Temperature,°C	40		40		40
	pH	7.9		8.0		8.0
Speed	Yankee ,FPM.	1450		1450		1450
	Reel ,FPM.	1140		1140		1140
Percent Crepe		27.1		27.1		27.1
Head Box Level	,IN.	114		116		115
Basis Weight	,G./M.^{2}	16.4	16.8	17.0	17.2	16.9
MD. Tensile Strength	,G./15MM.	302	304	282	284	293
CD. Tensile Strength	,G./15MM.	82	92	85	96	89
Ratio		3.7	3.3	3.3	3.0	3.3

Data 6

Reel No.		1	22	3	4	Average
Stuff Box	Consistency,%	2.80		2.79		2.80
	Freeness ,CSF.	278		268		273
Head Box	Consistency,%	0.350		0.348		0.349
	Temperature,°C	41		41		41
	pH	7.8		7.6		7.7
Speed	Yankee ,FPM.	1450		1450		1450
	Reel ,FPM.	1140		1140		1140
Percent Crepe		27.1		27.1		27.1
Head Box Level	,IN.	114		114		114
Basis Weight	,G./M.^{2}	17.6	17.7	17.9	17.1	17.6
MD. Tensile Strength	,G./15MM.	296	351	342	336	331
CD. Tensile Strength	,G./15MM.	101	104	118	105	107
Ratio		3.0	3.3	2.9	3.2	3.1

Part 3

Data in this part are consisted of data 7, 8 and 9 which are data from manufacturing facial tissue on 15th, 16th and 17th May, 1975. Pulps which are used in this operation are,

80% Export sulphite (soft wood bleached sulphite pulp)

20% Coho-k (soft wood bleached kraft pulp)

The purpose in analysing the data is to find out the relationship of consistency of stock in the head box, MD. breaking length, CD. breaking length and the ratio of tensile strengths of the tissue paper. The consistency of stock in the head box is a variable operating condition while others are set constant. The results are concluded in result 3 and graph 3 in appendix A.

Data 7

Reel No.		1	2	3	4	5	6	7	8	Average
Stuff Box	Consistency,%	2.88			2.93			2.82		2.88
	Freeness ,CSF.	447			477			425		450
Head Box	Consistency,%	0.295			0.310			0.305		0.303
	Temperature,°C	37			37			37		37
	pH	7.7			7.8			7.8		7.8
Speed	Yankee ,FPM.	1440			1440			1440		1440
	Reel ,FPM.	1130			1130			1130		1130
Percent Crepe		27.4			27.4			27.4		27.4
Head Box Level	,IN.	115			115			115		115
Basis Weight	,G./M.^{2}	17.6	16.7	17.2	17.3	16.7	17.0	17.4	17.4	17.2
MD. Tensile Strength	,G./15MM.	384	390	360	380	384	368	383	316	370
CD. Tensile Strength	,G./15MM.	80	76	70	86	70	78	78	73	76
Ratio		4.8	5.1	5.2	4.4	5.5	4.7	4.9	4.4	4.9

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Data 8

Reel No.		1	2	3	4	5	6	7	8	Average
Stuff Box	Consistency,%	2.96			2.98			2.89		2.94
	Freeness ,CSF.	469			436			442		449
Head Box	Consistency,%	0.247			0.243			0.239		0.243
	Temperature,°C	35			36			36		36
	pH	7.6			7.5			7.5		7.5
Speed	Yankee ,FPM.	1440			1440			1440		1440
	Reel ,FPM.	1130			1130			1130		1130
Percent Crepe		27.4			27.4			27.4		27.4
Head Box Level	,IN.	114			117			117		116
Basis Weight	,G./M.^{2}	17.2	17.5	17.4	17.0	17.2	17.5	17.3	17.5	17.3
MD, Tensile Strength	,G./15MM.	348	338	355	342	307	362	324	350	342
CD. Tensile Strength	,G./15MM.	80	76	81	72	90	94	90	89	84
Ratio		4.4	4.4	4.4	4.7	3.4	3.8	3.6	4.0	4.1

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Data 9

Reel No.		1	2	3	4	5	6	7	8	Average
Stuff Box	Consistency,%	2.76			2.87			2.88		2.84
	Freeness ,CSF.	465			432			442		446
Head Box	Consistency,%	0.193			0.220			0.225		0.217
	Temperature,°C	35			37			37		36
	pH	7.6			7.8			7.7		7.7
Speed	Yankee ,FPM.	1440			1440			1440		1440
	Reel ,FPM.	1130			1130			1130		1130
Percent Crepe		27.4			27.4			27.4		27.4
Head Box Level	,IN.	117			117			116		117
Basis Weight	,G./M.^{2}	16.4	17.0	16.5	16.3	16.3	16.5	16.4	16.4	16.5
MD. Tensile Strength	,G./15MM.	293	210	260	320	356	342	372	314	309
CD. Tensile Strength	,G./15MM.	103	81	103	110	105	110	120	112	106
Ratio		2.8	2.6	2.5	2.9	3.4	3.1	3.1	2.8	2.9

Part 4

Part 4 are divided into section 1 and section 2. In section 1, the data have been gotten from manufacturing facial tissue and in section 2 from manufacturing toilet tissue. The purpose in analysing this part is to find out the effect of qualities of furnish on MD. breaking length, CD. breaking length and the ratio of tensile strengths of the tissue paper. In each section the mixture ratio and quality of furnish have been changed while the operating conditions are set constant.

Section 1

Data in part 4 section 1 are consisted of data 10 and 11. Pulps which are used in this operation are,

Furnish type 1

83% Export sulphite (soft wood bleached sulphite pulp)

17% Sekunda (hard wood bleached kraft pulp)

Furnish type 2

80% Export sulphite (softwood bleached sulphite pulp)

20% Coho-k (soft wood bleached kraft pulp)

Data 10 and 11 are data from manufacturing facial tissue on 26th February and 17th May, 1975. The results are concluded in result 4(a) in appendix A.

Data 10

Reel No.		1	2	3	4	5	6	Average
Stuff Box	Consistency,%	2.90			2.94			2.92
	Freeness ,CSF.	457			465			461
Head Box	Consistency,%	0.306			0.310			0.308
	Temperature,°C	35			35			35
	pH	8.0			8.0			8.0
Speed	Yankee ,FPM.	1440			1440			1440
	Reel ,FPM.	1130			1130			1130
Percent Crepe		27.4			27.4			27.4
Head Box Level	,IN.	115			117			116
Basis Weight	,G./M.^{2}	16.8	16.9	16.7	17.0	16.5	16.4	16.7
MD. Tensile Strength	,G./15MM.	296	262	316	360	307	328	309
CD. Tensile Strength	,G./15MM.	43	46	40	49	50	51	47
Ratio		6.0	6.0	7.9	7.3	6.1	6.4	6.6

Data 11

Reel No.		1	2	3	44	5	6	Average
Stuff Box	Consistency,%	2.88			2.93			2.91
	Freeness ,CSF.	457			467			462
Head Box	Consistency,%	0.295			0.310			0.303
	Temperature,°C	37			37			37
	pH	7.7			7.8			7.8
Speed	Yankee ,FPM.	1440			1440			1440
	Reel ,FPM.	1130			1130			1130
Percent Crepe		27.4			27.4			27.4
Head Box Level	,IN.	115			115			115
Basis Weight	,G./M.^{2}	17.6	16.7	16.8	17.2	17.3	17.3	17.2
MD. Tensile Strength	,G./15MM.	384	390	340	360	388	380	374
CD. Tensile Strength	,G./15MM.	80	76	84	70	88	86	81
Ratio		4.8	5.1	4.0	5.2	4.4	4.4	4.7

Section 2

Data in part 4 section 2 are consisted of data 12 and 13 which are data from manufacturing toilet tissue on 26th and 28th April, 1975. Pulps which are used in this operating condition are,

Furnish type 1

50% Coho-k (soft wood bleached kraft pulp)

50% Rottneros (ground wood)

Furnish type 2

36% Coho-k (soft wood bleached kraft pulp)

28% Rottneros (ground wood)

The results of this section are concluded in result 4(b) in appendix A.

Data 12

Reel No.		1	2	3	4	5	6	Average
Stuff Box	Consistency,%	2.86			2.90			2.88
	Freeness ,CSF.	379			385			382
Head Box	Consistency,%	0.312			0.315			0.313
	Temperature,°C	38			38			38
	pH	8.2			8.3			8.3
Speed	Yankee ,FPM.	1420			1420			1420
	Reel ,FPM.	1120			1120			1120
Percent Crepe		27.5			27.5			27.5
Head Box Level	,IN.	114			113			114
Basis Weight	,G./M.^{2}	17.9	17.7	17.7	18.1	18.0	17.7	17.8
MD. Tensile Strength	,G./15MM.	366	369	314	302	320	341	335
CD. Tensile Strength	,G./15MM.	76	71	72	78	70	79	75
Ratio		4.8	4.9	4.4	3.9	4.6	4.3	4.5

Data 13

Reel No.			1	2	3	4	5	6	Average
Stuff Box	Consistency,%		2.86			2.86			2.86
	Freeness	,CSF.	389			399			394
Head Box	Consistency,%		0.314			0.310			0.312
	Temperature,	°C	38			38			38
	pH		8.4			8.2			8.3
Speed	Yankee	,FPM.	1420			1420			1420
	Reel	,FPM.	1120			1120			1120
Percent Crepe			27.5			27.5			27.5
Head Box Level		,IN.	114			113			114
Basis Weight		,G./M.^{2}	17.4	17.2	17.6	17.2	17.3	18.0	17.5
MD. Tensile Strength		,G./15MM.	396	398	369	361	358	340	371
CD. Tensile Strength		,G./15MM.	101	110	100	95	103	97	111
Ratio			3.9	3.6	3.7	3.5	3.8	3.5	3.6