Table Ⅲ-2-1 COMPARISON IN QUALITY BETWEEN SEKA'S NEWSPRINT

		SEKA AKUSU	SEKA BALIKESIR	CANADA	NORWAY	FRANCE	JAPAN
Unit quantity	g/m²	50.8	51.3	48.9	49.6	49.2	47.6
Thickness		0.098	0.097	0.081	0.084	0.082	0.073
Density	g/cm³	0.52	0.53	0.60	0.59	0.60	0.65
Bursting strength	Kgf/cm²	0.64	0.72	0.83	0.81	0.78	0.93
Tensile strength							
(MD)	Kgf	2.87	3.47	3.58	3.44	3.05	4.12
(CD)	Kgf	1.28	1.06	1.33	1.31	1.17	1.13
Elongation							
(MD)	%	1.1	1.3	1.0	1.1	1.3	1.4
(CD)	%	2.1	2.0	2.6	2.9	2.5	3.4
Tear Factor							
(MD)	gf	28	21	21	20	22	27
(CD)	gf	38	34	27	32	33	43
Porocity	sec	14.4	7.6	38.4	55.2	27.8	37.6
Surface strength							
(Surface)	A	3	6	7	6	6	8
(Back side)	A	3	6	7	6	6	8
Brightness							
(Surface)	%	46.3	43.7	55.1	55.8	56.2	53.1
(Back side)	%	46.7	43.2	55.6	55.4	56.0	53.6
Opacity	%	93.1	91.4	91.2	91.8	92.6	89.7
Moisture content	%	9.4	9.2	8.9	9.1	8.3	8.5

Testing conditions: Temperature 20 +
Humidity 65 + 2%

Table Ⅲ-2-2 COMPARISON IN SHIVE VALUE BETWEEN SEKA'S NEWSPRINT AND IMPORTED NEWSPRINT

	SEKA AKUSU	SEKA BALIKESIR	CANADA	NORWAY	FRANCE	JAPAN
Shive Value (time/20g)	60	16	16	14	10	2

Table Ⅲ-2-3 EVALUATION OF QUALITY OF SEKA'S NEWSPRINT IN BIG NEWSPAPER COMPANIES

(1)

NEWSPAPER Evaluation of quality	S A B A H	M I L L I Y E T	H U R R I Y E T
Sheet break	①When the printing speed is increased, the incidence of sheet break is also increased. The Akusu mill's newsprint, in particular, causes sheet break so frequently. ②Sheet break occurs almost always at tsugite is found, but still sheet break occurs. This defect should be corrected as quickly as possible. ③The frequent going in and out of the core causes trouble so often. defect also should be corrected as quickly as possible.	①SEKA's newsprint causes sheet break so often. The average sheet break rate is 19 percent for SEKA's newsprnt, while it is 10 percent for imported newsprint. ②In the case of the Aksu mill's newsprint, the longer the press time, the higher becomes the incidence of sheet break, which makes it impossible to use this type of newsprint. ③Sheet breaks occurs so often at joint. ④Low gloss and the destruction of the cores cause vibration, which causes sheet break.	①Low gloss and the destruction of the cores cause the reel to be swung, which causes sheet break. ②Defective joint causes sheet break. ③Flaw of reel also causes sheet break. ④SEKA's newsprint is low in paper strength. ⑤The frequent going in and out of the cores causes sheet break and twist. This defect should be corrected as possible.
Pickling	SEKA's newprint causes more pickling than imported newsprint.	SEKA's newprint causes pickling so often. After printing 30,000 to 50,000 copies, it becomes necessary to clean the blankets and the paper rolls.	SEKA's newsprint causes pickling so often. After printing 35,000 to 50,000 copies, it becomes necessary to clean the blankets and the paper rolls.
Printability and ink receptability	SEKA's newsprint is inferior to imported newsprint in terms of ink receptability and printability (particularly color printing).	Low gloss and high ink mileage makes it difficult for colors coming out well.	The same comments as MILLIYET's.

NEWSPAPER Evaluation of quality	S A B A H	M I L L I Y E T	H U R R I Y E T
Out of register	Out of register occurs at the start of printing, but this is corrected by a computer-control system. (As satellite-type rotary presses are used, out of register does not occur so frequently.)	Out of register occurs as a result of the flow of paper in a horizontal direction.	Low gloss or out of register occurs so often. Low gloss and out of register occurs so often in the case of the 1,520mm-wide reel, in partucular.
Flaw of reel	Out of register occurs ofter as a result of improper handling.	Flaw of reel if serious and frequent at both the center and edges of the reel. Accordingly, sheet peel occurs so often. It is strongly demanded that improper product handling and packaging at SEKA's mills be corrected.	①The same comments as MILLIYET's. ②Transformation of the reels by roll cramps sometimes destructs the cores, making some reels unusable. (It seems transformation fo the reels occurs when they are unloaded from trucks at the time of delivery to the print shops.)
others	Sheet crampling does not occur so frequently while newspapers are printed.	The weight and diameter of the reel differ from one reel to another. It seems SEKA has no well-defined product standards.	Products are managed poorly. The reel's diameter differs from one reel to another. The cores are not strong enough.
Combined evaluation	It is hard to rank SEKA's newsprint, but overall SEKA's newsprin is inferior to imported newsprint.	Imported newsprint is superior to SEKA's newsprint in all respects.	①SEKA's newsprint is far inferior to imported newsprint. ②Sheet breaks occurs 19 times a day on average in the case of imported newsprint.

Table Ⅲ-2-4 COMPARATIVE EVALUATION OF QUALITY OF SEKA'S NEWSPRINT AND IMPORTED NEWSPRINT IN MAJOR ISTANBUL NEWSPAPER COMPANIES

NEWSPAPER Evaluation of quality	SEKA'S Newsprint	Imported Newsprint
Sheet break	①Sheet break occurs 19 times a day on avarage (MILLIYET). ②Sheet break occurs almost always at tsugite of the reel. ③If the press time is long, sheet break occurs so often that it become impossible to use the newsprint.	①Sheet break occur 10 times a day on average (MILLIYET). ②Sheet break does not occur so often at tsugite of the reel. ③The length of the press time is not directly related to the occurrence of sheet break.
Going in and out of the cores	The frequent goint in and out of the cores causes trouble.	There is hardly any going in and out of cores. When it occurs the width ranges from 1 to 2 mm, which causes no trouble.
Pickling	①SEKA's newprint cuases pickling so often. ②After printing 30,000 to 50,000 copies, it becomes necessary to clean the blankets and the paper rolls.	Imported newsprint causes far less pickling than SEKA's newsprint.
Printing effort	①Colors (particulartly red and yellow colors) do not come out well. ②Out of register is more likely to occur. ③More printing ink is required than in the case of imported newsprint. ④The entire printed page do not look so good as in the case of imported newsprint. ⑤The newsprint's color is bluish and the entire newsprint looks dull-hued.	①Colors come out better than in the case of SEKA's newsprint. ②Out of register does not occur so frequently. ③Only ordinary quantity of printing ink is required. ④The entire printed page looks better than in the case of SEKA's newsprint. ⑤Higher in whiteness.
Roll quality	①In the case of the 76cm reel, the weight varies widely, from 420 to 250 kg. ②Transformation of reel and flow of reel occurs frequently. ③There are many cases of gloss.	①The weight is strictly within a range of 400kg±10kg ②Flaw of reel occurs. ③There are not so many cases of low gloss.

Table Ⅲ-3-1 OBSERVED PULP SECTION OPERATION CONDITIONS

	FREENESS °SR		CONSISTENCY %		TEMPERATURE ℃		PH		REFERENCE
	FEB. /28	MAR. /2	FEB. /28	MAR. /2	FEB. /28	MAR. /2	FEB. /28	MAR. /2	
BULL SCREEN	69	72	1.62	1.76	68	65	6.0	6.3	
	AVE. 71.5		1.69		66.5		6.15		
GP HOLDING CHEST	72	68	4.50	5.35	60	58	—	6.6	
	AVE. 70		4.93		59				
SURGE TANK	73	70	4.50	4.40	61	58	—	5.1	
	AVE. 71.5		4.45		59.5				
BKP BEFORE REFINER	8	8	4.10	4.85	32	30	—	6.7	DAMP CHEST TEMPERATURE 30.7℃
	AVE. 8		4.48		31				
BKP AFTER REFINER	17	17	3.90	4.20	40	35	—	6.7	
	AVE. 17		4.05		37.5				
MACHINE CHEST	65	61	4.20	4.10	40	43	—	5.6	
	AVE. 63		4.15		41.5				
STOCK INLET	80	80	0.67	0.63	32	35	—	6.9	
	AVE. 80		0.65		33.5				
THICKENED BROKE CHEST						30			n=3 29 29 32
WHITE WATER RECOVER POLY DISK FILTER					(IN-LET)	30.1			n=3 30 30 32
					(OUT-LET)	27.7			n=3 27 28 28
WATER STORAGE						27			26 26 29

Table III-4-1 PLANNED PRODUCTION BY SECTOR

(Unit:Bill.TL)

	1989 Value	Share (%)	1994 Value	Share (%)	Growth Rate (%)
Agriculture	23220.9	11.70	28477.2	10.10	4.17
Forestry	1787.4	0.90	1963.0	0.70	1.89
Fishery	1269.1	0.64	1838.9	0.65	7.70
Mining	3653.7	1.84	4951.1	1.76	6.27
Manufacturing	84416.1	42.53	125741.7	44.61	8.30
Energy & Water	4627.3	2.33	7883.3	2.80	11.24
Construction	12725.0	6.41	18735.5	6.65	8.04
Trade	25740.2	12.97	36440.3	12.93	7.20
Transportation	23960.0	12.07	33325.0	11.82	6.82
Financing	3301.8	1.66	4426.6	1.57	6.04
Real Estate	4479.0	2.26	5939.9	2.11	5.81
Public Services	5334.9	2.69	6654.3	2.36	4.52
Other Services	3964.8	2.00	5469.2	1.94	6.65
Total Production	198480.2	100.00	281846.0	100.00	7.27

Table III-4-2 PROCUCTION AND DEMAND OF SELECTED SECTOR

(Unit:Mill.TL)

	1984 (Actual)	1988 (Actual)	Growth Rate (% p.a.)	1989 (Estimated)	1994 (Planned)	Growth Rate (% p.a.)
PRODUCTION						
Forestry	1770475	1778137	0.11	1787430	1963005	1.89
Manufacturing						
-Wooden Furniture	535680	742920	8.52	790800	1161960	8.00
-Paper	1462953	1627226	2.70	1934725	2751500	7.30
All Sectors	90232541	113486238	5.90	118974621	170855262	7.51
EXPORT						
Forestry	44125	38216	-3.53	47396	66150	6.90
Manufacturing						
-Wooden Furniture	43911	20539	-17.30	21346	107936	38.28
-Paper	88636	102675	3.74	138816	237205	11.31
Total	176672	161430	-2.23	207558	411291	14.66
IMPORT						
Forestry	64581	258794	41.49	310554	609080	14.42
Manufacturing						
-Wooden Furniture	1487	5439	38.29	2989	6006	14.98
-Paper	200638	385894	17.76	351963	535130	8.74
Total	266706	650127	24.95	665506	1150216	11.56
NET DEMAND						
Forestry	1790931	1998715	2.78	2050588	2505935	4.09
Manufacturing						
-Wooden Furniture	493256	727820	10.21	772443	1060030	6.53
-Paper	1574955	1910445	4.95	2147872	3049425	7.26
Total	3859142	4636980	4.70	4970903	6615390	5.88

Table III-4-3 DEMAND AND SHARE OF FORESTRY PRODUCTS

	ACTUAL DEMAND				PLANNED DEMAND				CHANGE OF SHARE(Q'TY)			
	1984 Quantity (1000 M3)	1984 Value (Mill.TL)	1988 Quantity (1000 M3)	1988 Value (Mill.TL)	1989 Quantity (1000 M3)	1989 Value (Mill.TL)	1994 Quantity (1000 M3)	1994 Value (Mill.TL)	1984 Share(%)	1988 Share(%)	1989 Share(%)	1994 Share(%)
PRODUCTION												
Industrial Wood	9329	991881	10199	1098633	10800	1182158	14484	1635869	27.18	29.82	31.26	39.70
-Log	5203	724225	5700	807787	6250	888928	8950	1292814	15.16	16.67	18.09	24.53
-Wooden Pole	148	17316	180	21060	180	21060	145	16965	0.43	0.53	0.52	0.40
-Mine Poles	547	49230	580	52200	570	51300	543	48870	1.59	1.70	1.65	1.49
-Pulp Log	1464	102480	1536	108419	1550	109250	1870	130900	4.26	4.49	4.49	5.13
-Wood Chip	1260	49140	1453	56667	1480	57720	2000	78000	3.67	4.25	4.28	5.48
-Others	707	49490	750	52500	770	53900	976	68320	2.06	2.19	2.23	2.68
Fire Wood	25000	650000	24000	624000	23750	617500	22000	572000	72.82	70.18	68.74	60.30
Other NW Product		136433		145838		146421		160964	7.67	7.81	7.52	6.80
Total	34329	1778314	34199	1868471	34550	1946079	36484	2368833	100.00	100.00	100.00	100.00
EXPORT												
Industrial Wood	133	24334	36	9084	47	11984	65	16573	100.00	100.00	100.00	100.00
Other NW Product		19791		29132		35412		49577	0.00	0.00	0.00	0.00
Total	133	44125	36	38216	47	47396	65	66150	100.00	100.00	100.00	100.00
IMPORT												
Industrial Wood	4	1564	1010	152636	1250	191228	2900	451864	100.00	100.00	100.00	100.00
Other NW Product		63017		106158		119326		157216	0.00	0.00	0.00	0.00
Total	4	64581	1010	258794	1250	310554	2900	609080	100.00	100.00	100.00	100.00
NET DEMAND												
Industrial Wood	9200	969111	11173	1242185	12003	1361402	17319	2071160	26.90	31.77	33.57	44.05
Fire Wood	25000	650000	24000	624000	23750	617500	22000	572000	73.10	68.23	66.43	55.95
Other NW Product	0	179659	0	222864	0	230335	0	268603	0.00	0.00	0.00	0.00
Total	34200	1798770	35173	2089049	35753	2209237	39319	2911763	100.00	100.00	100.00	100.00

Table III-4-4 INDUSTRIAL WOOD PRODUCTION IN 1985

(Unit:m3)

	AMASYA	ARTVIN	ERZURUM	GIRESUN	TRABZON	TOTAL
SOFT WOOD						
Cedar	0	0	0	0	0	0
Juniper	0	0	0	0	0	0
Redpine	0	0	0	0	0	0
Other Pines	174950	26050	153300	27500	13000	394800
Spruce	0	104300	7000	87500	74800	273600
Fir	15100	47350	0	4800	8000	75250
TOTAL	190050	177700	160300	119800	95800	743650
HARD WOOD						
Oak	0	0	0	0	0	0
Hornbeam	0	0	0	600	0	600
Beech	110200	43900	0	52000	8700	214800
Poplar	0	0	0	0	0	0
Alder	0	400	0	6200	500	7100
Others	0	33000	0	1400	4500	38900
TOTAL	110200	77300	0	60200	13700	261400
GRAND TOTAL	300250	255000	160300	180000	109500	1005050
SHARE (%)	29.9	25.4	15.9	17.9	10.9	100.0

Table III-4-5 INDUSTRIAL WOOD PRODUCTION IN 1986

(Unit:m3)

	AMASYA	ARTVIN	ERZURUM	GIRESUN	TRABZON	TOTAL
SOFT WOOD						
Cedar	0	0	0	0	0	0
Juniper	0	0	0	0	0	0
Redpine	1000	0	0	0	0	1000
Other Pines	191000	21500	129500	25500	11900	379400
Spruce	0	77000	500	71300	76000	224800
Fir	10000	47000	0	6000	8500	71500
TOTAL	202000	145500	130000	102800	96400	676700
HARD WOOD						
Oak	0	600	0	0	0	600
Hornbeam	0	0	0	0	0	0
Beech	100500	42000	0	60800	7100	210400
Poplar	0	0	0	0	0	0
Alder	0	800	0	5100	1500	7400
Others	0	28600	0	1300	4500	34400
TOTAL	100500	72000	0	67200	13100	252800
GRAND TOTAL	302500	217500	130000	170000	109500	929500
SHARE (%)	32.5	23.4	14.0	18.3	11.8	100.0

Table III-4-6 INDUSTRIAL WOOD PRODUCTION IN 1987

(Unit:m3)

	AMASYA	ARTVIN	ERZURUM	GIRESUN	TRABZON	TOTAL
SOFT WOOD						
Cedar	0	0	0	0	0	0
Juniper	0	0	0	0	0	0
Redpine	5300	0	0	0	0	5300
Other Pines	188000	18600	129200	21000	12600	369400
Spruce	0	82400	800	77000	73700	233900
Fir	14000	43800	0	3700	7200	68700
TOTAL	207300	144800	130000	101700	93500	677300
HARD WOOD						
Oak	0	400	0	0	0	400
Hornbeam	0	0	0	0	0	0
Beech	107200	29500	0	50200	6200	193100
Poplar	7500	0	0	0	0	7500
Alder	0	800	0	3400	1200	5400
Others	0	37500	0	24700	8100	70300
TOTAL	114700	68200	0	78300	15500	276700
GRAND TOTAL	322000	213000	130000	180000	109000	954000
SHARE (%)	33.8	22.3	13.6	18.9	11.4	100.0

Table III-4-7 INDUSTRIAL WOOD PRODUCTION IN 1988

(Unit:m3)

	AMASYA	ARTVIN	ERZURUM	GIRESUN	TRABZON	TOTAL
SOFT WOOD						
Cedar	0	0	0	0	0	0
Juniper	0	0	0	0	0	0
Redpine	5300	0	0	0	0	5300
Other Pines	178000	16400	126100	20500	23000	364000
Spruce	0	92900	900	72800	63200	229800
Fir	11000	48800		5000	5500	70300
TOTAL	194300	158100	127000	98300	91700	669400
HARD WOOD						
Oak	0	400	0	0	0	400
Hornbeam	0	100	0	400	0	500
Beech	113600	38800	0	59800	8300	220500
Poplar	8100	0	0	0	0	8100
Alder	0	2700	0	6000	900	9600
Others	0	34900	0	21500	20100	76500
TOTAL	121700	76900	0	87700	29300	315600
GRAND TOTAL	316000	235000	127000	186000	121000	985000
SHARE (%)	32.1	23.9	12.9	18.9	12.3	100.0

Table III-4-8 INDUSTRIAL WOOD PRODUCTION IN 1989

(Unit:m3)

	AMASYA	ARTVIN	ERZURUM	GIRESUN	TRABZON	TOTAL
SOFT WOOD						
Cedar	0	0	0	0	0	0
Juniper	0	0	0	0	0	0
Redpine	10900	0	0	0	0	10900
Other Pines	206400	18400	103000	12600	16000	356400
Spruce	0	87600	1000	44700	47100	180400
Fir	11800	47500	0	1700	6000	67000
TOTAL	229100	153500	104000	59000	69100	614700
HARD WOOD						
Oak	700	400	10000	200	0	11300
Hornbeam	0	0	0	1000	0	1000
Beech	96000	47900	0	54900	7800	206600
Poplar	3600	0	0	200	0	3800
Alder	0	2800	0	6000	4800	13600
Others	2600	45400	13000	28700	21300	111000
TOTAL	102900	96500	23000	91000	33900	347300
GRAND TOTAL	332000	250000	127000	150000	103000	962000
SHARE (%)	34.5	26.0	13.2	15.6	10.7	100.0

Table III-4-9 PULPWOOD PRODUCTION IN AMASYA

(Unit:m3)

	1985	1986	1987	1988	1989	TOTAL
SOFT WOOD						
Cedar	0	0	0	0	0	0
Juniper	0	0	0	0	0	0
Redpine	0	1000	4400	4400	6000	15800
Other Pines	25700	35000	38000	34000	35600	168300
Spruce	0	0	0	0	0	0
Fir	4300	2000	5600	4000	4400	20300
TOTAL	30000	38000	48000	42400	46000	204400
HARD WOOD						
Oak	0	0	0	0	0	0
Hornbeam	0	0	0	0	0	0
Beech	0	0	0	0	0	0
Poplar	0	0	0	0	0	0
Alder	0	0	0	0	0	0
Others	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0
GRAND TOTAL	30000	38000	48000	42400	46000	204400
SHARE (%)	14.7	18.6	23.5	20.7	22.5	100.0

Table III-4-10 PULPWOOD PRODUCTION IN ARTVIN

(Unit:m3)

	1985	1986	1987	1988	1989	TOTAL
SOFT WOOD						
Cedar	0	0	0	0	0	0
Juniper	0	0	0	0	0	0
Redpine	0	0	0	0	0	0
Other Pines	8000	2000	2700	3500	3000	19200
Spruce	47700	25000	24000	26000	30000	152700
Fir	24300	18000	13700	15500	17000	88500
TOTAL	80000	45000	40400	45000	50000	260400
HARD WOOD						
Oak	0	0	0	0	0	0
Hornbeam	0	0	0	0	0	0
Beech	0	0	0	0	0	0
Poplar	0	0	0	0	0	0
Alder	0	0	0	0	0	0
Others	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0
GRAND TOTAL	80000	45000	40400	45000	50000	260400
SHARE (%)	30.7	17.3	15.5	17.3	19.2	100.0

Table III-4-11 PULPWOOD PRODUCTION IN GIRESUN

(Unit:m3)

	1985	1986	1987	1988	1989	TOTAL
SOFT WOOD						
Cedar	0	0	0	0	0	0
Juniper	0	0	0	0	0	0
Redpine	0	0	0	0	0	0
Other Pines	16000	14000	8800	7000	4000	49800
Spruce	68000	52000	34800	36000	35000	225800
Fir	2000	4000	2000	3000	1000	12000
TOTAL	86000	70000	45600	46000	40000	287600
HARD WOOD						
Oak	0	0	0	0	0	0
Hornbeam	0	0	0	0	0	0
Beech	0	0	0	0	0	0
Poplar	0	0	0	0	0	0
Alder	0	0	0	0	0	0
Others	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0
GRAND TOTAL	86000	70000	45600	46000	40000	287600
SHARE (%)	29.9	24.3	15.9	16.0	13.9	100.0

Table III-4-12 PULPWOOD PRODUCTION IN TRABZON

(Unit:m3)

	1985	1986	1987	1988	1989	TOTAL
SOFT WOOD						
Cedar	0	0	0	0	0	0
Juniper	0	0	0	0	0	0
Redpine	0	0	0	0	0	0
Other Pines	0	0	0	1300	1500	2800
Spruce	51000	41500	34800	28800	18600	174700
Fir	8000	8500	5200	4900	4900	31500
TOTAL	59000	50000	40000	35000	25000	209000
HARD WOOD						
Oak	0	0	0	0	0	0
Hornbeam	0	0	0	0	0	0
Beech	0	0	0	0	0	0
Poplar	0	0	0	0	0	0
Alder	0	0	0	0	0	0
Others	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0
GRAND TOTAL	59000	50000	40000	35000	25000	209000
SHARE (%)	28.2	23.9	19.1	16.7	12.0	100.0

Table III-4-13 PULPWOOD PRODUCTION BY SPECIES IN GIRESUN AREA

(Unit:m3)

	1985	1986	1987	1988	1989	TOTAL	Share(%)
Red Pine		1000	4400	4400	6000	15800	1.6
Other Pine	49700	51000	49500	45800	44100	240100	24.9
Spruce	166700	118500	97200	90800	83600	556800	57.7
Fir	38600	32500	26500	27400	27300	152300	15.8
Total	255000	203000	177600	168400	161000	965000	100.0
Share (%)	26.4	21.0	18.4	17.5	16.7	100.0	

Table III-4-14 WOOD INVENTORY BY SPECIES IN FORESTRY AREA (1988)

(Unit: ,m3)

	AMASYA	ARTVIN	ERZURUM	GIRESUN	TRABZON	TOTAL
SOFT WOOD						
Red Pine	26490	0	0	0	0	26490
Black Pine	86664	0	0	0	0	
Yellow Pine	273998	47548	243873	45518	33233	644170
Fir	19390	84859	627	15700	24380	144956
Spruce	0	168171	1989	112862	168647	451669
Cedar	0	0	0	0	0	0
Junpier	372	0	0	5	0	377
Pinus Pinea	0	0	0	0	0	0
Cypress	0	0	63	0	0	63
Others	0	0	0	98	0	98
TOTAL	406914	300578	246552	174183	226260	1354487
HARD WOOD						
Beech	252061	96163	0	192087	63287	603598
Oak	14482	3025	5	779	62	18353
Hornbeam	5066	1513	67	4027	1041	11714
Alnus	4531	6532	0	15928	10456	37447
Poplar	3953	0	0	353	82	4388
Chestnut	1823	8605	0	2239	1305	13972
Lime Tree	0	589	0	0	0	589
Alder	0	0	0	24	0	24
Others	7897	2960	54	11110	1886	23907
TOTAL	289813	119387	126	226547	78119	713992
GRAND TOTAL	696727	419965	246678	400730	304379	2068479

Table III-4-15 PULPWOOD SUPPLY IN GIRESUN AREA

(Unit:m3)

	AMASYA	ARTVIN	ERZURUM	GIRESUN	TRABZON	TOTAL
1985	30000	80000	0	86000	59000	255000
1986	38000	45000	0	70000	50000	203000
1987	48000	40400	0	45600	40000	174000
1988	42400	45000	0	46000	35000	168400
1989	46000	50000	0	40000	25000	161000
1990	64889	50667	0	65450	39370	220376
1991	64889	50667	0	65450	39370	220376
1992	64889	50667	0	65450	39370	220376
1993	64889	50667	0	65450	39370	220376
1994	64889	50667	0	65450	39370	220376

Table III-4-16 RAW MATERIAL SUPPLY ESTIMATION BY SEKA

	Spruce/Fir	Spruce/Fir (Additional)	Pine (1) Silvestris	Pine (2) Nigra	Pine (3) Martima	Pine Total	Log Total	Waste Paper
	(cu.m)	(cu.m)	(cu.m)	(cu.m)	(cu.m)	(cu.m)	(cu.m)	(MT)
1994	180,000	0	60,000	30,000	10,000	100,000	280,000	35,000
1995	180,000	0	60,000	30,000	10,000	100,000	280,000	35,000
1996	180,000	0	60,000	30,000	10,000	100,000	280,000	35,000
1997	180,000	0	60,000	30,000	10,000	100,000	280,000	35,000
1998	180,000	0	60,000	30,000	10,000	100,000	280,000	35,000
1999	180,000	60,000	60,000	30,000	10,000	100,000	340,000	35,000
2000	180,000	60,000	60,000	30,000	10,000	100,000	340,000	35,000
2001	180,000	60,000	60,000	30,000	10,000	100,000	340,000	35,000
2002	180,000	60,000	60,000	30,000	10,000	100,000	340,000	35,000
2003	180,000	60,000	60,000	30,000	10,000	100,000	340,000	35,000
2004	180,000	60,000	60,000	30,000	10,000	100,000	340,000	35,000
2005	180,000	60,000	60,000	30,000	10,000	100,000	340,000	35,000
2006	180,000	60,000	60,000	30,000	10,000	100,000	340,000	35,000
2007	180,000	60,000	60,000	30,000	10,000	100,000	340,000	35,000
2008	180,000	60,000	60,000	30,000	10,000	100,000	340,000	35,000

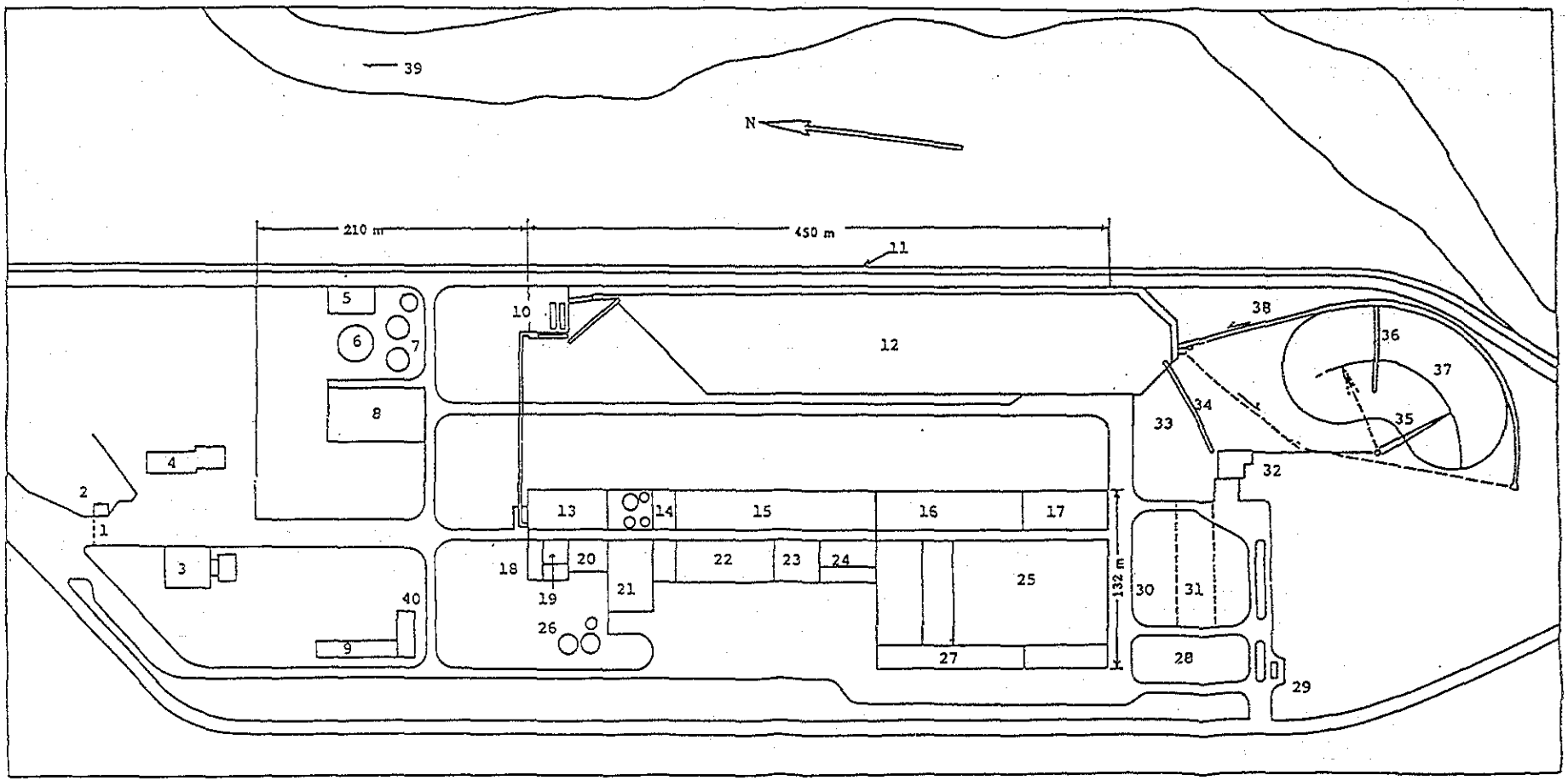
NOTE : The additional spruce and fir would be supplied only when the Izmit Pulp Mill would be shutdown.

The resource of Pine (3) (i.e. Pinus Maritima) is preferably preserved and not used for the project unless wood supply is critial.

Table III-4-17 LOG SOURCE AND DISTANCE

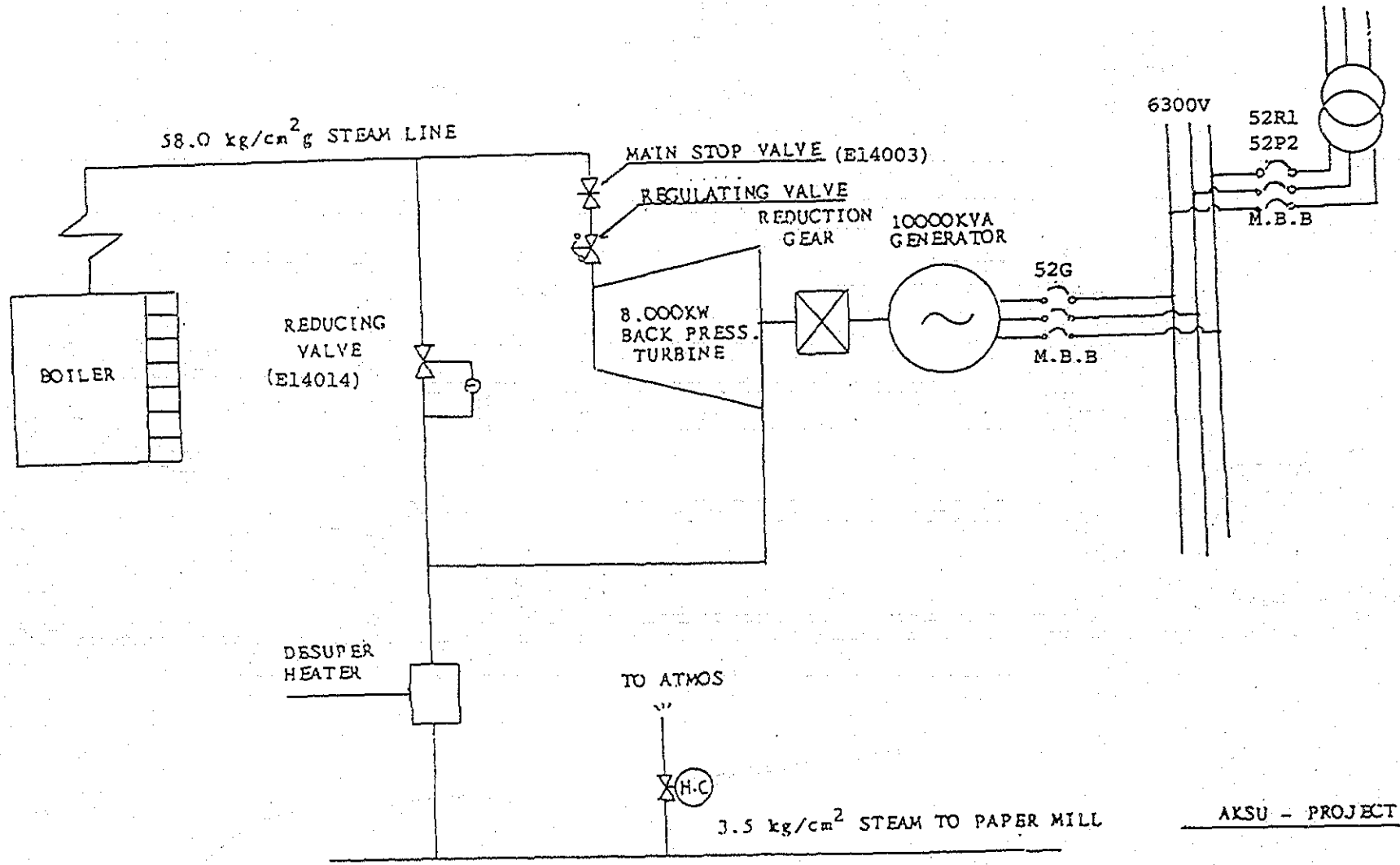
Distance (km)	1987 (m3)	Share(%)	1988 (m3)	Share(%)
<100	29,358	19	29,489	18
101 - 200	25,548	16	16,700	10
201 - 300	19,802	12	13,159	8
301 - 400	26,989	17	34,606	21
401 - 500	51,858	33	56,930	34
501 - 600	4,943	3	14,185	9
TOTAL	158,498	100	165,069	100

Fig. III-1-1 PLOT PLAN OF EXISTING AKSU MILL



1 Gate
2 Guard House
3 Shower Room
4 Office Building
5 Settling Pond
6 Clarifier
7 Water Treatment Facility
8 Parts;Materials Warehouse
9 Motor Poor
10 Drum Barker
11 Fence
12 Wood Pond
13 GP Room
14 Stock Preparation Room
15 Paper Machine Room
16 Finishing Room
17 Sheet Paper Storage
18 Substation
19 Turbin Room
20 Boiler House
21 KP Pulper
22 Machine Shop
23 Material Warehouse
24 Wet Wrap Machine
25 Roll Paper Storage
26 Fuel Oil Tank
27 Truck Loading Terminal
28 Log Yard
29 Log Weigher
30 Log Yard
31 Log Crane
32 Slasher
33 Conveyor
34 Recycling Stream
35 Stacker
36 Conveyor
37 Log Pile
38 Water Stream
39 Aksu River
40 Fire Station

Fig. III-3-1 SHEMATIC FLOW DIAGRAM OF BOILER, TURBIN-GENERATOR, ELECTRICITY



AKSU - PROJECT

SUMMARY SKELETON DIAGRAM

8,000 KW POWER STATION

Fig. Ⅲ-3-2 TRANSITION OF FREENESS & TEMPERATURE

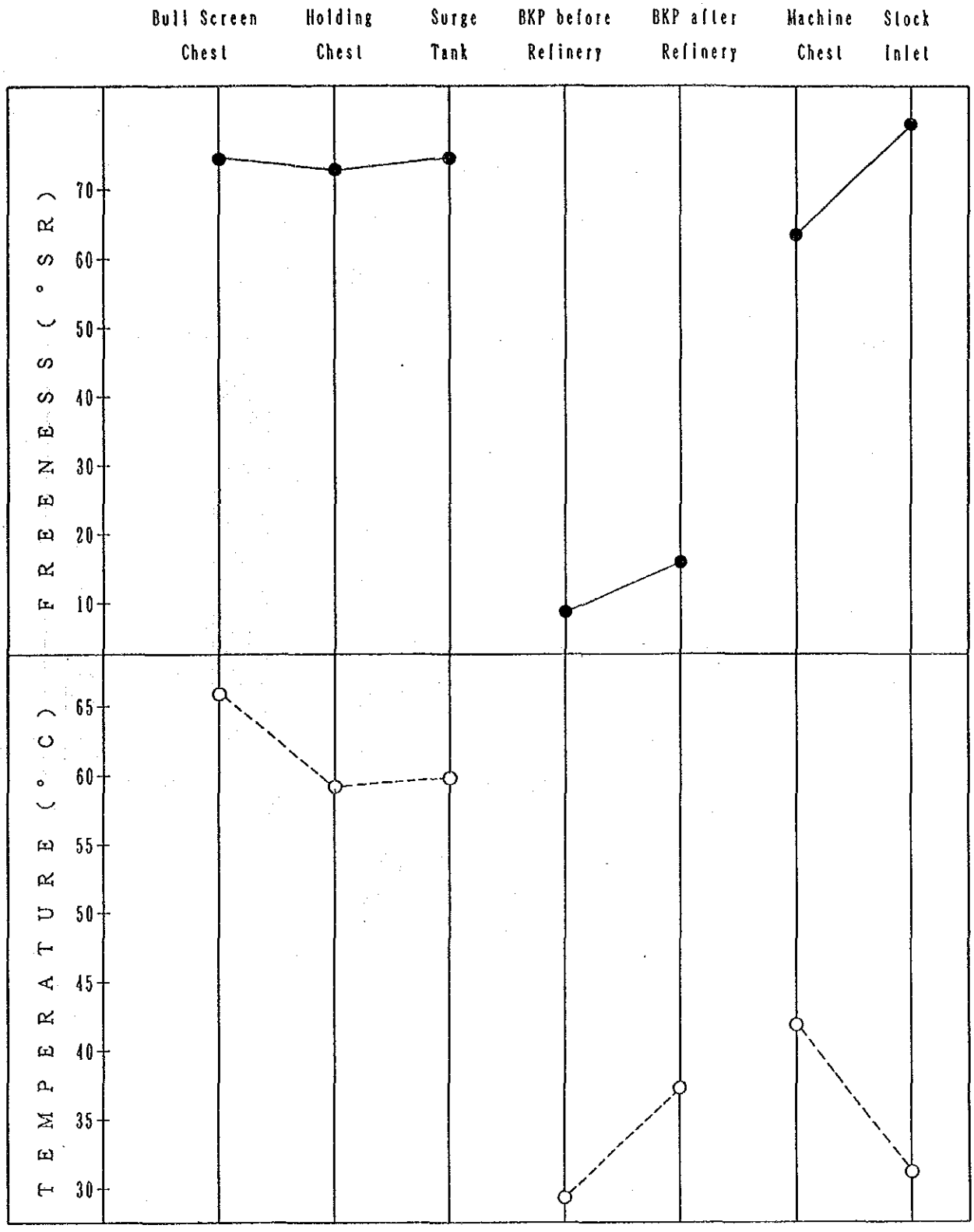
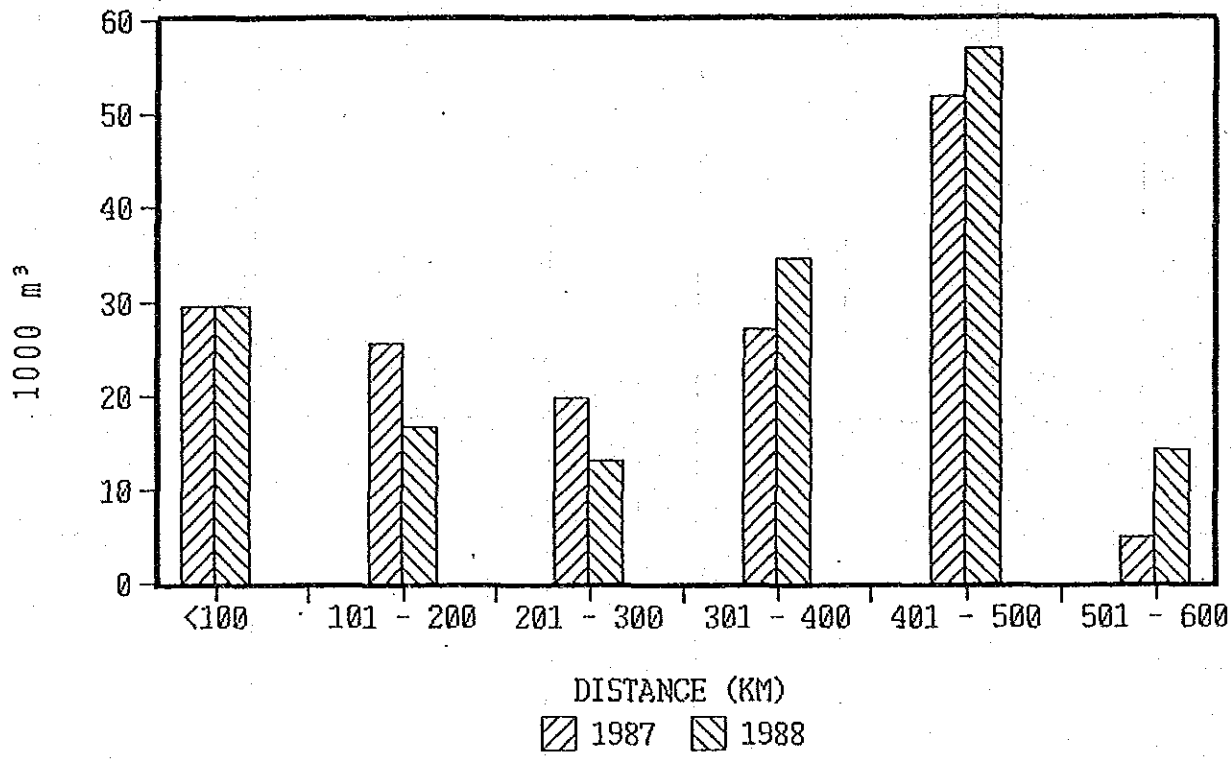


Fig. III-4-1 LOG SOURCE AND DISTANCE



T 227 om-85
TENTATIVE STANDARD—1943
OFFICIAL STANDARD—1946
REVISED—1958
OFFICIAL TEST METHOD—1985

Attachment III-2-1

Freeness of pulp

1. Scope

The freeness test is a wholly empirical procedure which gives an arbitrary measure of the rate at which a suspension of 3 g of pulp in 1 L of water may be drained. The result depends mainly upon the quantity of debris present (*1*), and, to a lesser extent, the degree of fibrillation of the fibers, their flexibility, and their fineness. Besides these factors, the result is dependent also on conditions under which the test is carried out, such as pressure head, stock concentration, temperature, character of the draining surfaces, and construction of the drainage orifices.

2. Significance

The instrument and conditions here described (*2*) were designed to yield results primarily suited to the control of the manufacture of groundwood pulp. They have been used also by some for following the apparent change in the draining quality of various pulps during beating and for the control of beaters and refiners (see also TAPPI T 221 "Drainage Time of Pulp"). Treatments which produce a large proportion of fines may sometimes cause an anomalous rise of freeness (false freeness) usually at values below 100 mL. Readings do not necessarily correlate with the drainage quality of a stock on a paper machine.

3. Apparatus

3.1 *Freeness tester*,[1] shown in Fig. 1, is required to have a drainage chamber and a rate-measuring funnel, mounted on a suitable support so that both are held exactly level.

3.1.1 The chamber is a bronze cylinder, the bottom of which is covered with a perforated brass plate and closed with a heavy bronze bottom lid, hinged on one side of the cylinder and latched at the other. The inner side of this lid is covered with a gasket which fits against the flange around the lower side of the perforated plate (screen plate) when the lid is closed. The lid should be fitted so that not more than 5 mL of water will flow when the bottom cover is opened at the start of the test. The upper end of the cylinder is closed by a similar lid attached to the shelf bracket in which the cylinder is held when in use. The hinge and latching mechanism are designed to provide an airtight closure, the gasket being put under pressure when the lid is latched shut. An air-cock is provided for the upper lid, by which air can be admitted to the cylinder at the start of the test.

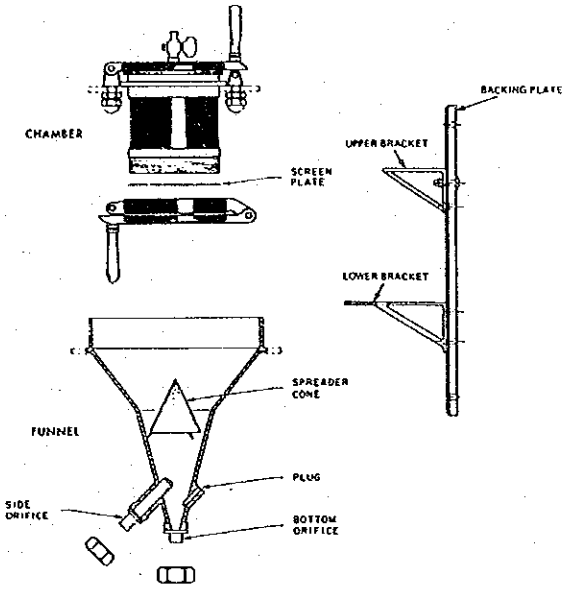


Fig. 1. Freeness tester.

3.1.2 The inside dimensions of the cylinder are 102 ± 0.5 mm (4 in.) in diameter by 127 mm (5 in.) high from the upper surface of the screen plate to the rim. The diameter is a critical dimension. The specified height gives the cylinder a capacity of slightly over 1000 mL above

[1]Names of suppliers of testing equipment and materials may be available from the TAPPI Information Resources Administrator

Approved by the Pulp Testing Committee of the Process and Product Quality Division
TAPPI

the screen plate. The air-cock bore is 4.8 ± 0.8 mm (3/16 ± 1/32 in.). The screen plate is 111.0 ± 0.5 mm in diameter, 0.51 mm (0.020 in.) thick and has perforations of 0.51 mm (0.020 in.) in diameter, spaced 97 per cm^2 (625 per $in.^2$) of surface. The plate is held in position with the burrs of the punched perforations downwards. It has not been found possible to duplicate these plates by specifying their physical dimensions, so all plates are standardized against master plates[1].

3.1.3 The rate-measuring conical funnel is of heavy bronze construction with an open cylindrical top, 203 mm (8 in.) inside diameter and the funnel has an overall depth of 278 mm (10 15/16 in.), neither dimension being critical. The bottom apex of the conical part is machined on the inside to a 29° ± 5′ slope which flares out to the top cylindrical portion. The bottom of the funnel terminates with a carefully-machined, removable, orifice-piece. The lower part of the funnel is also provided with a side discharge orifice in the form of a tube.

3.1.4 The diameter of the opening in the bottom orifice is 3.05 ± 0.013 mm (0.1200 ± 0.0005 in.) It is designed so as to deliver 530 ± 5 mL of 20°C water per minute, when the funnel is fed with slightly more than this quantity (700 to 750 mL/min) so that there is a moderate overflow of the excess through the side orifice.

NOTE 1: The bottom orifice can be kept clean by using a moistened pipe cleaner or a moist, soft, cotton string.

3.1.5 The side orifice tube is 12.7 mm (0.50 in.) inside diameter (not critical) and extends into the funnel. The inside end of the tube is cut at such an angle that the top side of the tube slightly overhangs the lower. The tube is so inserted that the volume between the top of the bottom orifice piece and the overflow level of the tube is 23.5 ± 0.2 mL. This volume is adjusted during calibration and must not be changed. Its influence on the test is secondary to the rate of flow out of the bottom orifice. The height of the overflow level is adjusted during calibration and must not be changed.

3.1.6 A detachable spreader cone is supported on three legs inside the funnel to prevent splash from directly entering the side orifice tube. The cylinder and the drainage cone are each supported by flanges in the openings of two machined shelves supported by a slate wall panel. Mount the instrument so as to minimize vibration. Level by means of a machinist's level placed in the open top of the rate-measuring funnel, in position in the lower brackets. Rotation of the level on the funnel will show when the instrument is mounted in a true level position. When the funnel is mounted in this fashion, the remaining components will be properly aligned and the instrument is ready for operation.

3.1.7 *Care of instrument.*

3.1.7.1 Keep the instrument clean and free from stock accumulations, pitch, oil or grease. Normally, keep the 1-L chamber filled with clean water.

NOTE 2: Continual use with a sulfite pulp or a sized paper stock will cause the surfaces inside the cone to become water-repellent. Wash with a solution of a synthetic detergent and hot water to make this surface wettable, then thoroughly rinse with clean water.

3.1.7.2 After each test, rinse the chamber with clean water. It is particularly necessary to see that no pulp is left in the holes of the screen plate. If the instrument is to be left out of use, preferably keep the chamber full of water, otherwise carefully and thoroughly wash away any pulp that might dry on it, and leave both top and bottom lids of the cylinder open. Before making a test, thoroughly wet all the inside surfaces of the instrument with clean water, using a detergent only when necessary. If a detergent is used, rinse well with clean hot water to remove *all traces* of the detergent. This is most important.

NOTE 3: It is strongly recommended that one, or preferably two, spare standard screen plates be kept for reference. The screen plate in current use may then be checked from time to time against one of these, which in turn is checked against the second, or ultimate reference screen plate, once or twice a year, and after use the reference plate should be cleaned, dried, and carefully stored away. With careful use, a screen plate has a long life but under usual mill conditions it soon may become dirty with an accumulation of resin. Resin may be removed with xylene followed by thorough washing with hot water and a detergent. *Under no circumstances should acid be used to clean the plate.* Bent or damaged screen plates should be discarded. When replacing the screen plate, care should be taken to avoid any pressure that will squeeze the chamber out of round. If necessary, use a strap wrench, not a vise, to grip it.

3.1.7.3 The side orifice tube is precisely set during calibration before the instrument is sent to the purchaser. Under no circumstances should the side orifice be removed or disturbed. If the side orifice is known to have been removed, its funnel should be returned for recalibration. Testers should be periodically recalibrated.

3.2 *Graduated cylinders*, 1000 mL and one of the same or lesser capacity with 10 mL or smaller divisions, to suit the pulp being tested.

3.3 *Standard disintegrator* (required only when the pulp is not in slush form), described in Appendix A of TAPPI T 205 "Forming Handsheets for Physical Tests of Pulp."

3.4 *Bucket*, of at least 10-L capacity to hold the stock.

3.5 *Dipper*, a shallow plastic-ware tea cup with a thick, smooth lip is recommended.

3.6 *Büchner funnel* and flask.

3.7 *Weighing bottle*, preferably shallow type, to accommodate a folded pad of pulp from the Büchner funnel.

4. Sampling

4.1 When dealing with a mill consignment, take a sample of pulp, about 25.8 cm^2 (4 $in.^2$) in area, from the interior of every bale included in the official test for moisture. (Portions of specimens taken for the moisture test, but not dried, may be used.) The weight of the composite sample should be at least 50 g, and preferably 100 g or more, of dry fiber for duplicate tests. For slush pulps, take a representative sample equivalent to at least 18 g of dry fiber.

4.2 *Test specimen*. Unless the pulp sampled is in slush form, disintegrate in water as follows: Weigh to the nearest 0.5 g a representative specimen by tearing equal portions from all the sample collected, equivalent to 24 g of moisture-free fiber. Do not cut the pulp or use cut edges. If the sample is dry, wet it thoroughly with cold water, tear into pieces about 2.5 cm (1 in.) square and soak in water in a bucket for 4 h, or, in the case of a dried sample of mechanical pulp which is to be furnished in the moist form, allow it to soak for 24 h.

NOTE 4: As far as is known, soaking pulp for a longer time than 4 h, for example, overnight, does not appreciably affect the results.

5. Disintegration

5.1 Make the mixture up to 2000 mL (1.2% consistency) with cold water at 20 ± 2°C and disintegrate for 75,000 revolutions (25 min) in the standard disintegrator with the propeller running at 3000 rpm in the stock.

NOTE 5: In view of the possible effect of dissolved material on the freeness test, it may be desirable to use distilled water for dilution of the stock for precise work in checking data between laboratories.

NOTE 6: Pulp should be disintegrated until free of fiber bundles. If 75,000 revolutions is too long, a shorter time may be used and made part of the test report.

5.2 It is essential to have the pulp specimen completely defibered before making a freeness test, and after disintegration, the pulp should be examined by diluting a small portion to see that the fibers are completely dispersed. If not, and if the pulp has been adequately soaked previously, continue to disintegrate for another 7500 revolutions (2.5 min). If not dispersed, continue the disintegration in steps until the stock is completely difibered. If other than the 25-min defibering time in the standard disintegrator has to be used, be sure to make a prominent note of the stock preparation employed in the report (see Additional Information). Take the temperatures of the stock and the water to be used for diluting. Dilute the defibered pulp to 0.3 ± 0.02% (moisture-free) consistency after adjusting the temperature of the diluting water so that the temperature of the stock in the bucket is 20 ± 2°C.

NOTE 7: It is necessary that the water used for diluting the sample be sufficiently free from dissolved air so that small bubbles are not liberated from the water in the pulp mixture. Water taken from high-pressure mains may require to be left standing for several hours, or else subjected to a vacuum before use.

5.3 Determine the consistency to three significant figures, by stirring well and filtering a representative specimen of the stock through a tared filter paper in the Büchner funnel. Dry the pad at 105 ± 3°C, place in a tared weighing bottle, cool in a desiccator, open the cover to equalize the air pressure, and weigh.

NOTE 8: For most purposes it is not necessary to have the specimen at exactly 0.3% consistency or 20°C, as the appended Tables 1 and 2 enable corrections to be made. Corrections outside the ±0.02% and ±2°C limits may give questionable results. The tables are based primarily on tests made with groundwood and the freer corrections with sulfite pulps. Consequently, their application to various other pulps may be questionable, and in the case of unusual pulps or for particular purposes, it is advisable to adjust the temperature and concentration to be as near the standard conditions as possible.

6. Procedure

6.1 Thoroughly clean and wet the freeness tester with clean water at about 20°C. Place the drainage chamber on the upper supporting bracket with its lower lid secured and the air-cock in the upper lid open. Place the graduated cylinder in position to receive the discharge from the side orifice.

6.2 Thoroughly stir the stock in the bucket sufficiently to ensure a homogenous mix and accurately measure 1000 mL into a clean 1-L cylinder. Take its temperature to the nearest 0.5°C. Mix the sample in the graduated cylinder with the hand and invert the cylinder 180° three times. Pour the stock gently but as rapidly as possible into the chamber. It is imperative that at the end of the pouring, the stock be motionless in the chamber. Close the top lid; close the air-cock; open the bottom lid and, after an interval of 5 s from the time that the addition of the stock is completed, open the air-cock to start the flow.

6.3 When the side discharge has ceased, record the volume discharged from the side orifice. If less than 100 mL, make readings to the nearest mL; if from 100 to 250 mL, to the nearest 2 mL; and if over 250 mL, to

the nearest 5 mL. To determine consistency, combine the pulp from the chamber, side orifice discharge, and bottom orifice and drain the slurry in a low deckle sheet machine or on filter paper in a Büchner funnel. Oven-dry to constant weight to determine the weight of the pad. When necessary, adjust the observed volume to the standard consistency of 0.3% and temperature of 20°C, by means of corrections given in Tables 1 and 2.

NOTE 9: It is immaterial which correction is applied first, the second correction being made to the volume adjusted by the first correction.

6.4 Make at least two determinations on separate portions of the same specimen and supplement them by additional tests if they differ by more than 1.5%.

7. Report

Report the average freeness reading corrected to 0.3% consistency and 20°C, to the nearest 1 mL on readings less than 100 mL, 2 mL on readings from 100 to 250 mL, and the nearest 5 mL on readings over 250 mL. Unless the sample was in slush form or the standard defibering time and conditions were used, state also the procedure and time employed for defibering the pulp.

8. Precision

8.1 The precision of a freeness test is dependent upon the level of the test and the type of pulp being tested. Long-fibered pulp such as softwood chemical pulp will show more variation than hardwood pulp or groundwood pulp. Test results between 300 and 500 mL will show more variation than tests which are either higher or lower than this.

8.2 *Repeatability.* Calculations based on 486 freeness tests made in one laboratory on fifty-three samples of pulp indicate that the repeatability as defined in TAPPI T 1206 "Precision Statement for Test Methods" will be as follows for the average of two determinations:

Freeness level	*Softwood chemical pulp*	*Hardwood chemical pulp*	*Groundwood pulp*
600	12 mL	6 mL	-
400	16 mL	12 mL	-
200	12 mL	7 mL	8 mL
50			5 mL

8.3 *Reproducibility.* Calculations based on 162 tests made in eleven laboratories of one company indicate that softwood chemical pulp beaten to a freeness of 531 mL will have a reproducibility as defined in T 1206 of 25 mL for the average of two measurements. Data are not available for other pulps or other freeness levels.

9. Additional information

9.1 *Effective date of issue: February 7, 1985.*

9.2 The test was originally designed for use with groundwood slush pulp and did not include, as part of the method, any preliminary disintegration. Any disintegration reduces the freeness of a pulp to an extent depending on the freeness of the original stock, the degree of pressing or drying of the laps, and the time kept in the pressed condition.

9.3 In general, with slush stock for control purposes, or when measuring the freeness of beaten or prepared stock, disintegration should be avoided unless the fibers are not thoroughly dispersed. However, where pulps are taken for test from a shipment, even if from moist laps or bales, the standard disintegration procedure with 24 g in 2 L of stock for 75,000 revolutions should be followed. This not only usually insures complete dispersion of the fibers but also simulates to some degree the defibering treatment that the stock will receive in the mill before use.

References

1. Thode, E. F., and Ingmanson, W. L., *Tappi* 42 (1): 74 (1959)(especially p. 82).
2. Technical Section, Canadian Pulp and Paper Association, Official Standard Testing Method C.1.

Your comments and suggestions on this procedure are earnestly requested and should be sent to the TAPPI Test Methods Administrator.

TABLE I. FREENESS CORRECTIONS TO 20°C *

Freeness read	Temperature of stock at test, °C																					Freeness read
	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
	Points freeness to be added											Points freeness to be subtracted										
30	11	9	8	7	6	5	4	3	2	1	0	1	2	3	4	5	6	7	8	9	11	30
40	12	10	9	8	7	6	5	3	2	1	0	1	2	3	5	6	7	8	9	10	12	40
50	14	12	11	10	8	7	6	4	3	1	0	1	3	4	6	7	8	10	11	12	14	50
60	15	14	12	11	9	8	6	4	3	1	0	1	3	4	6	8	9	11	12	14	15	60
70	17	15	13	12	10	8	7	5	3	2	0	2	3	5	7	8	10	12	13	15	17	70
80	19	17	15	13	11	9	8	6	4	2	0	2	4	6	8	9	11	13	15	17	19	80
90	20	18	16	14	12	10	8	6	4	2	0	2	4	6	8	10	12	14	16	18	20	90
100	21	19	17	15	13	10	8	6	4	2	0	2	4	6	8	10	13	15	17	19	21	100
110	23	21	18	16	14	11	9	7	5	2	0	2	5	7	9	11	14	16	18	21	23	110
120	25	22	20	17	15	12	10	7	5	2	0	2	5	7	10	12	15	17	20	22	25	120
130	26	23	21	18	16	13	11	8	5	3	0	3	5	8	11	13	16	18	21	23	26	130
140	27	24	22	19	16	14	11	8	5	3	0	3	5	8	11	14	16	19	22	24	27	140
150	29	26	23	20	17	14	11	9	6	3	0	3	6	9	11	14	17	20	23	26	29	150
160	30	27	24	21	18	15	12	9	6	3	0	3	6	9	12	15	18	21	24	27	30	160
170	31	28	25	22	18	15	12	9	6	3	0	3	6	9	12	15	18	22	25	28	31	170
180	32	29	26	22	19	16	13	10	6	3	0	3	6	10	13	16	19	22	26	29	32	180
190	33	30	26	23	20	16	13	10	6	3	0	3	6	10	13	16	20	23	26	30	33	190
200	34	31	27	24	20	17	13	10	7	3	0	3	7	10	13	17	20	24	27	31	34	200
210	35	31	28	24	21	18	14	10	7	3	0	3	7	10	14	18	21	24	28	31	35	210
220	36	32	29	25	22	18	14	10	7	4	0	4	7	10	14	18	22	25	29	32	36	220
230	37	33	30	26	22	19	15	11	7	4	0	4	7	11	15	19	22	26	30	33	37	230
240	38	34	31	27	23	19	15	11	8	4	0	4	8	11	15	19	23	27	31	34	38	240
250	39	35	31	27	23	20	16	12	8	4	0	4	8	12	16	20	23	27	31	35	39	250
260	40	36	32	28	24	20	16	12	8	4	0	4	8	12	16	20	24	28	32	36	40	260
270	41	37	33	29	24	20	16	12	8	4	0	4	8	12	16	20	24	29	33	37	41	270
280	42	38	34	29	25	21	17	13	8	4	0	4	8	13	17	21	25	29	34	38	42	280
290	42	38	34	29	25	21	17	13	8	4	0	4	8	13	17	21	25	29	34	38	42	290
300	43	39	34	30	25	21	17	13	8	4	0	4	8	13	17	21	25	30	34	39	43	300
310	43	39	34	30	25	21	17	13	8	4	0	4	8	13	17	21	25	30	34	39	43	310
320	43	39	34	30	25	21	17	13	8	4	0	4	8	13	17	21	25	30	34	39	43	320
330	44	40	35	31	26	22	18	13	9	4	0	4	9	13	18	22	26	31	35	40	44	330
340	44	40	35	31	26	22	18	13	9	4	0	4	9	13	18	22	26	31	35	40	44	340
350	44	40	35	31	26	22	18	13	9	4	0	4	9	13	18	22	26	31	35	40	44	350
360	44	40	35	31	26	22	18	13	9	4	0	4	9	13	18	22	26	31	35	40	44	360
370	45	41	36	31	26	22	18	13	9	4	0	4	9	13	18	22	26	31	36	41	45	370
380	45	41	36	31	27	22	18	13	9	4	0	4	9	13	18	22	27	31	36	41	45	380
390	45	41	36	31	27	23	18	14	9	4	0	4	9	14	18	23	27	31	36	41	45	390
400	46	41	37	32	28	23	18	14	9	4	0	4	9	14	18	23	28	32	37	41	46	400
420	45	41	36	31	27	23	18	14	9	4	0	4	9	14	18	23	27	31	36	41	45	420
440	45	41	36	31	27	22	18	13	9	4	0	4	9	13	18	22	27	31	36	41	45	440
460	44	40	35	31	27	22	18	13	9	4	0	4	9	13	18	22	27	31	35	40	44	460
480	43	39	34	30	25	21	17	13	8	4	0	4	8	13	17	21	25	30	34	39	43	480
500	42	38	34	29	25	21	17	13	8	4	0	4	8	13	17	21	25	29	34	38	42	500
520	42	38	33	29	24	20	16	12	8	4	0	4	8	12	16	20	24	29	33	38	42	520
540	42	37	33	28	24	20	16	12	8	4	0	4	8	12	16	20	24	28	33	37	42	540
560	41	37	32	28	24	20	16	12	8	4	0	4	8	12	16	20	24	28	32	37	41	560
580	41	36	32	28	24	20	16	12	8	4	0	4	8	12	16	20	24	28	32	36	41	580
600	40	36	32	28	24	20	16	12	8	4	0	4	8	12	16	20	24	28	32	36	40	600
620	39	35	31	27	23	19	16	12	8	4	0	4	8	12	16	19	23	27	31	35	39	620
640	37	33	29	25	21	18	14	11	7	4	0	4	7	11	14	18	21	25	29	33	37	640
660	36	32	28	25	21	17	14	10	7	3	0	3	7	10	14	17	21	25	28	32	36	660
680	35	31	27	24	20	17	13	10	6	3	0	3	6	10	13	17	20	24	27	31	35	680
700	33	30	26	23	20	16	13	9	6	3	0	3	6	9	13	16	20	23	26	30	33	700

*Prepared by the Pulp and Paper Research Institute of Canada.

TABLE II. FREENESS CORRECTIONS TO 0.30% CONSISTENCY*

Freeness read	Consistency of stock at test, %																				Freeness read
	0.20	0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.40	
	Points freeness to be subtracted										Points freeness to be added											
20	..	..	..	..	..	..	..	..	..	..	0	2	3	5	7	9	11	13	15	17	19	20
30	..	..	..	..	..	10	8	6	4	2	0	2	4	6	8	10	13	15	17	19	21	30
40	22	20	18	16	13	11	9	7	5	2	0	3	5	7	9	12	14	17	19	21	23	40
50	25	23	20	18	15	13	10	8	6	3	0	3	6	8	10	13	16	18	21	23	25	50
60	28	25	22	19	17	14	11	9	6	3	0	3	6	9	11	14	17	19	22	25	27	60
70	31	27	23	20	18	15	12	9	5	3	0	3	6	9	12	15	18	21	24	27	29	70
80	33	29	25	22	19	16	13	9	6	3	0	4	7	10	13	16	19	22	25	28	31	80
90	36	31	27	24	21	17	13	10	7	3	0	4	7	10	13	16	20	23	26	29	32	90
100	38	33	29	26	22	18	14	10	7	3	0	4	7	11	14	17	21	24	27	30	34	100
110	40	35	31	27	23	19	15	11	7	3	0	4	8	11	14	18	22	25	28	31	35	110
120	42	37	33	29	24	19	15	11	7	3	0	4	8	11	15	19	23	26	29	33	36	120
130	44	39	35	30	25	20	16	12	8	4	0	4	8	12	15	20	24	27	31	35	38	130
140	46	41	36	31	26	21	17	12	8	4	0	4	8	12	16	20	24	28	32	36	40	140
150	48	42	37	32	27	22	17	12	8	4	0	4	8	12	16	21	25	30	34	38	42	150
160	50	44	39	33	28	23	18	13	9	4	0	4	8	13	17	22	26	31	35	39	43	160
170	52	46	40	34	29	24	19	14	10	5	0	5	9	14	18	23	27	32	36	41	45	170
180	54	48	42	36	30	25	20	15	10	5	0	5	10	15	19	24	28	33	37	42	46	180
190	56	49	43	37	31	26	20	15	10	5	0	5	10	15	19	24	28	33	38	43	47	190
200	58	51	45	38	32	26	21	15	10	5	0	5	10	15	20	25	29	34	39	44	48	200
210	60	53	46	39	33	27	21	15	10	5	0	5	10	16	21	26	30	35	40	45	49	210
220	61	54	47	40	34	28	22	16	10	5	0	5	11	16	21	26	31	36	41	46	50	220
230	62	55	48	41	35	28	22	17	11	5	0	6	12	17	22	27	32	37	42	47	51	230
240	63	56	49	42	36	29	23	17	11	5	0	6	12	17	23	28	33	38	43	48	53	240
250	64	57	50	43	37	30	23	17	11	5	0	6	12	18	23	29	34	39	44	49	54	250
260	65	58	51	44	37	30	24	18	12	6	0	7	13	19	24	30	35	40	45	50	55	260
270	67	59	52	45	38	31	25	19	12	6	0	7	13	19	25	31	36	41	46	51	56	270
280	68	60	53	46	39	32	25	19	12	6	0	7	13	19	25	31	36	41	47	52	57	280
290	70	62	54	47	40	33	26	19	13	6	0	7	13	19	25	31	36	42	47	52	57	290
300	72	64	56	48	41	34	27	20	13	6	0	7	13	19	25	31	36	42	48	53	58	300
310	73	65	57	49	41	34	27	20	13	7	0	7	13	19	25	31	37	43	48	53	58	310
320	75	66	58	50	42	35	27	20	13	7	0	7	13	19	25	31	37	43	48	53	58	320
330	77	68	59	51	43	35	27	20	13	7	0	7	13	19	25	32	38	43	48	53	58	330
340	78	69	60	52	43	35	27	20	13	7	0	7	14	20	26	32	38	44	49	54	59	340
350	79	70	61	52	43	35	27	20	13	7	0	7	14	20	26	32	38	44	49	54	59	350
360	80	70	61	52	43	35	28	21	14	7	0	7	14	20	26	32	38	44	49	54	59	360
370	81	71	61	52	44	36	28	21	14	7	0	7	14	20	26	32	38	44	49	54	59	370
380	81	71	61	52	44	36	29	21	14	7	0	7	14	20	26	32	38	44	49	54	59	380
390	82	72	62	53	45	37	29	21	14	7	0	7	14	20	26	32	38	44	49	54	59	390
400	82	72	62	53	45	37	29	21	14	7	0	7	14	20	26	32	38	44	49	54	59	400
420	83	72	62	54	45	37	29	21	14	7	0	7	14	20	26	32	38	44	49	54	59	420
440	83	73	63	54	45	37	29	21	14	7	0	7	14	20	26	32	38	44	49	54	59	440
460	83	73	63	54	45	37	29	21	14	7	0	7	14	20	26	32	38	44	49	53	58	460
480	83	73	63	54	46	37	29	21	14	7	0	7	14	20	26	32	38	42	47	52	57	480
500	83	73	63	54	46	37	29	21	14	7	0	7	14	20	26	32	36	41	46	51	56	500
520	82	72	62	53	44	36	28	21	14	7	0	7	13	19	25	30	35	40	45	50	55	520
540	80	71	62	53	44	36	28	21	14	7	0	6	12	18	24	29	34	39	44	49	54	540
560	78	69	60	51	43	35	28	21	14	7	0	6	12	17	22	27	32	37	42	47	52	560
580	76	67	58	50	42	34	27	20	13	6	0	6	12	16	22	27	32	37	42	46	50	580
600	75	66	58	50	42	34	27	20	13	6	0	6	11	16	21	26	31	36	40	44	48	600
620	74	65	57	49	41	33	26	19	12	6	0	5	10	15	20	25	30	34	38	42	47	620
640	73	64	56	48	40	32	25	18	12	6	0	5	10	15	20	25	29	33	37	41	46	640
660	71	63	55	47	39	31	24	17	11	6	0	5	9	14	19	24	28	31	35	39	45	660
680	70	63	55	46	39	31	24	16	11	5	0	4	9	13	18	23	27	30	34	38	44	680
700	69	62	54	46	38	30	23	16	11	5	0	4	8	13	18	22	26	29	33	37	42	700

*Prepared by the Pulp and Paper Research Institute of Canada.

ATTACHMENT III-2-2 QUESTIONNAIRE TO PAPER MACHINE

1. Fourdrinier table arrangement

2. Vacuum of wire suction box and couch roll

3. Press part

   1) Pick-up, 1P, 2P, 3P suction roll vacuum
   2) Pick-up, 1P, 2P, 3P suction box vacuum
   3) Nip linear pressure of 1P, 2P, 3P
   4) Felt supplier for 1P, 2P, 3P
      Quality grade, g/m^2, life-time (Day)
   5) Felt shower temperature for 1P, 2P, 3P

4. Drainage

   1) Pressure, temperature for each section
   2) Steam supply pressure
   3) Steam consumption

5. Ventilation system

   1) Dry bulb, wet bulb temperature ^{o}C and dew point for No. 1, 2, 3, exhaust air
   2) Heat exchanger water temperature ^{o}C, in and out
   3) Incoming air temperature ^{o}C (dry bulb, wet bulb)

6. Drive

   1) Actual load for each section
   2) Speed for each section (draw)

7. Production on real

8. Cross profile record and chart

9. Sheet break

   1) Point of break
   2) Cause of break
   3) Loss time by each break

10. Dryer canvas

   1) Manufacture
   2) Grade and materials
   3) Porosity

11. M/C stop other than sheet break

   1) Planned shut-down

      a) Cause of shut-down
      b) Length of time of shut-down

   2) Unscheduled shut-down

      a) Cause of shut-down
      b) Length of time

ATTACHMENT III-2-3 REPLY TO QUESTIONNAIRE

1990年	Date	Production (Ton)		Sheet Break Time (Min.)				Scheduled Shut-down (Min.)		Emergency Shut-down (Min.)	
		Prodt. (Ton)		Press	Dryer	Calen-dar	Total	Min.	Cause	Min.	Cause
Jan.	1	222	230	70	85	10	165	90	Cleaning	—	—
	2	154	160	25	35	—	60	—		465	Noise cutter Malfunction, Adjustment
	3	59	16	—	—	—	—	1,320	Wire Change	360	Electrical Trouble in the Wire Part
	4	168	173	65	55	—	120	—		210	Electrical Trouble in the Wire Part
	5	218	225	40	—	20	60	90	Wire Change (?)	—	
	6	83	98	—	30	—	30	750	Wire Change (?)	150	Fibers Sticking to the Vacuum Box
	7	82	89	40	35	—	75	60	Cleaning	90	Fibers Sticking to the Vacuum Box
	8	55	—	—	—	—	—	1,440	Wire Part →		Remodeled to Foil Fourdrinier
	9	—	—	—	—	—	—	1,440	Wire Part Repair		
	10	—	—	—	—	—	—	1,440	Wire Part Repair		
	11	—	—	—	—	—	—	1,440	Wire Part Repair		
	12	—	—	—	—	—	—	1,440	Wire Part Repair		
	13	—	—	—	—	—	—	1,440	Wire Part Repair		
	14	—	—	—	—	—	—	1,440	Wire Part Repair		
	15	66	108	60	90	—	150	720	Wire Part Repair	—	
	16	183	212	65	120	25	210	30	Wire Attachment	30	Carrier Rope Breakage
	17	209	213	80	100	—	180	60	Cleaning	—	
	18	119	151	60	80	100	240	—		450	Press Screen Adjustment
	19	139	247	50	40	—	90	—		45	Chest Floodings
	20	125	84	40	40	50	130	—		1,125	Chest Floodings and Winder Trouble
	21	151	179	30	60	—	90	—		180 240	Press Screen Cleaning Vacuumpump Trouble
	22	220	226	35	55	—	90	60	Cleaning	90	Stock Valve Trouble
	23	201	215	15	60	—	75	—		255	Funnel Seal Replacement
	24	213	265	40	50	—	90	—		—	
	25	211	265	50	40	—	90	—		—	
	26	132	140	75	75	—	150	80	Cleaning	150 120	Consistency Controller Trouble Chest Floodings
	27	133	140	15	45	—	60	—		600 30	Winder Motor Trouble 2nd Carrier Rope Breakage
	28	267	265	30	30	—	60	—		—	
	29	241	257	35	55	—	90	—		—	
Total		3,651	3,958	920	1,180	205	2,305	13,340		4,590	

	Date	Production (Ton)		Sheet Break Time (Min.)				Scheduled Shut-down (Min.)		Eergency Shut-down (Min.)	
		Finish-ed	Reel	Press	Dryer	Calen-dar	Total	Min.	Cause	Min.	Cause
	30	161	183	—	15	—	15	—		330 300	Winder Motor Trouble 3-stage Motor Damage
	31	234	221	30	75	—	105	150	Cleaning		
Feb.	1	215	250	25	35	—	60	60	Cleaning	60	3rd Group Carrier Rope Breakage
	2	266	270	—	50	—	50	60	Cleaning	—	
	3	267	270	40	35	—	75	—		—	
	4	245	250	30	60	—	90	60	Cleaning	—	
	5	254	260	15	45	—	60	70	Cleaning	—	
	6	260	240	—	30	—	30	—		195	Vacuum Pump Coupling Damage
	7	243	265	—	15	—	15	—		75	3rd Cumpus Fixed
	8	265	252	15	15	—	30	60	Cleaning	75	Chest Floodings
	9	236	227	30	80	10	120	60	Cleaning	45	4th Carrier Rope Breakage
	10	281	260	—	60	—	60	60	Cleaning	—	
	11	262	268	15	15	—	30	45	Cleaning	—	
	12	257	270	—	45	—	45	60	Cleaning	—	
	13	261	275	—	15	—	15	—		45	Main Motor Trouble
	14	262	266	—	15	15	30	60	Cleaning	30	A clot of Stock Sticking to the Breast Roll
	15	181	200	15	60	15	90	—		225 60	Wire Shower Cleaning and Strainer Cleaning
	16	118	101	—	30	—	30	870	3P, roll change	30 45	} Main Motor Trouble
	17	77	60	15	15	—	30	780	1, 2, 3P Blanket Replacement	240	No. 1 Fan Pump Bearing Replacement
	18	261	272	25	20	—	45	—		—	
	19	263	255	15	75	—	90	60	Cleaning	—	
	20	253	242	15	90	15	120	60	Cleaning	—	
	21	267	255	40	35	—	75	90	Cleaning	—	
	22	237	240	—	60	—	60	45	Cleaning	180	Vacuum Pump Coupling Damage
	23	246	261	15	65	10	90	45	Cleaning	—	
	24	123	114	40	80	—	120	90	Cleaning	270 330	PDF Trouble Cleaning
	25	208	252	15	30	—	45	60	Cleaning	90	Calendar Rotor Seal Malfunction
	26	218	193	15	125	10	150	—		240	CRC Trouble
	27	138	175	45	60	—	105	—		450	Trouble and Vacuumpump scale Remove
	28	207	197	90	135	—	225	120	Cleaning	90	Carrier Rope Breakage
Total		6, 739	6, 844	545	1, 485	75	2, 105	2, 965		3, 405	

	Production (Ton)		Sheet Break Time (Min.)				Sheduled Shut-down (Min)		Emergency Shut-down (Min.)	
43, 200	Finish-ed	Reel	Press	Dryer	Calen-dar	Total	Min.	Cause	Min.	Cause
Sub-total	6, 739	6, 844	545	1, 485	75	2, 105	2, 965		3, 405	
Total	10, 390	10, 802	1, 465	2, 665	280	4, 410	16, 305			
84, 960										

ATTACHMENT III-2-4
INSPECTION OF PAPERMAKING EQUIPMENT DURING PLANNED STOPPAGES

Date : March 1, 1990
Hours: 9:00 to 17:00

1. Opening of the deculator pump and manhole

   (1) Inspection of cleanliness of the inside of the tank
   (2) Inspection of existence of damage in the shoot pipe

2. Pressure screen (Bird 14B type)

   (1) Opening of the top covers of the two screens. Inspection of the connection between the screen plate and the rotor blades.

   (2) One short connecting pipe on the stock accept side was detached (Equipment No. 08018). Inspection of the inside of the piping on the accept side. Inspection of existence of clogging in the screen plate on the accept side.

3. Stock inlet

   (1) The cheeking piece on the front side was detached. Inspection of dirt and corrosion in the bottom slice lip. Inspection of clearance between the bottom slice lip (apron) and the slice roll. Ascertained that there was no contact between them. Inspection of the connection between the top slice lip and the slice proper.

   (2) Careful cleaning of the bottom and top slice lips.
   The tip of the bottom lip.
   The tip and the back of the bottom lip.

(3) Cleaning of the part between the lower surface of the bottom slice lip and the breast roll. Clean the part by drawing down the breast roll 50 mm.

4. Wire part

Scrub the inside of the save-all with a brush, and then wash it with water shower.
Wash the wire pit.
Wash the outside of the save-all.
Confirm the relative location of the foaming board and hydrofoil.
Blow water off all the shower pipes, by opening the valves on the front side.
Inspect seal on either side of the wire suction box.

5. Press part

(1) Inspection of blocking-up of the shower pipe nozzle.
(2) Wash the lower side of the save-all on the upper part.

CHAPTER IV
ALTERNATIVES IN PLANNED RENOVATION

CHAPTER IV ALTERNATIVES IN PLANNED RENOVATION

1. Preconditions for Renovation Planning

1.1 Equipment and Production Conditions

1.1.1 Alternatives to Production Capacity

(1) Case 1

In this alternative, production capacity is increased by utilizing the existing equipment as much as possible. Production capacity is set between 95,000 tons/year and 100,000 tons/year.

(2) Case 2

In this alternative, newspaper imports are replaced by homemade paper as much as possible in line with the policy of foreign currency saving. Production capacity is set at 130,000 tons/year. Drastic improvement is needed in the speed of papermaking as well as in the existing equipment, in this case.

1.1.2 Product Quality

(1) Renovations include improvement in the quality of the mill's products to the extent that they are comparable to standard products on international markets. Renovations are aimed at removing disadvantages in selling prices.

(2) Renovations are also aimed at producing lighter newspaper, which is the international trend, and at consequent energy conservation. The basic paper weight is set at 45 grams/square meter.

(3) The goals of specifications of products from Aksu mill after renovation are set as follows, based on specifications of newsprint imported by newspaper companies of Turkey and specifications of newsprint typical in Japan.

1) Goal of product newspaper quality

Density	0.60 - 0.65
Tensile strength	M.D. 3.2kg<
	C.D. 1.2kg<
Tearing strength	M.D. 32g<
	C.D. 20g<
Brightness	52 - 53%

2) Goal of GP quality

Freeness (Canadian standard)	70 - 90cc
Shive (Alfthan shive analyzer)	50 - 80 times/20g

3) Goal of DIP quality

Brightness (Hunter)	50 - 55%

1.1.3 Raw Materials

(1) Utilization of Waste Paper

Renovations include mixing of waste paper, with limited wood resources in Turkey taken into consideration. Waste newsprint imports (including waste magazines) are used for the time being, with the present condition of waste paper recovery in the country taken into account. Waste paper requirement is set at 100 BDT/day (input) in Case 1 and Case 2 alike.

(2) Logs

Consumption of coniferous logs is limited to 180,000 cubic meters in Case 1 and Case 2 alike. The shortfall is covered by pine logs, whose consumption is limited to 90,000 cubic meters. In using pine logs, a treatment process that can cope with pitch trouble needs to be introduced. Pinus Maritima (10,000 cubic meters/year) among pines and coniferous logs of 60,000 tons/year obtained from SEKA's Izmit mill from 1999 on are excluded from the planned renovations.

(3) BKP

In the planned renovations, all KP to be mixed consists of imported BKP, though SBKP is domestically produced.

1.1.4 Environmental Measures

(1) Waste water disposal

The waste water treatment system that is being planned for Aksu mill (860 cubic meters/hour) is incorporated into planned waste water disposal after renovation. Waste water from DIP, which contains special contaminants, is treated in facilities independent of the paper pulp mill.

(2) Waste matter disposal

Sediment from the waste water treatment facilities, bark, and DIP waste are gathered and incinerated.

1.1.5 Renovation Execution Schedule

The schedule of renovation execution is assumed to be as follows.

Both Case 1 and Case 2

End of October 1990	: F/S completed
End of December 1990	: F/S review completed
From January 1991	: Application for Government's approval
October 1991	: Diet's consent
January 1992	: Government's permission
From February 1992	: Financing, preparation for execution
January to April 1993	: Preparation for bidding
April to August 1993	: Bidding, appraisal of bids
September to October 1993	: Major negotiations on contract, conclusion of a contract
From November 1993	: Commencement of renovation

Case 1

April to September 1995	: Shutdown (6 months)
April to August 1995	: Installation work
October 1995	: Commencement of commercial operation

Case 2

March 1995 to April 1996	: Shutdown (14 months)
June 1995 to January 1996	: Installation work
May 1996	: Commencement of commercial operation

1.1.6 Production Capacity of Existing Equipment

Production capacity of the existing equipment is regarded as 74,700 tons/year (basis weight of 49 grams/square meter, on an AD ton basis), for appraisal of renovation effects.

Though the average production capacity was about 60,000 tons/year as of 1989 at Aksu mill, improvement in capacity has been considerable as a result of recent introduction of plastic wires. Production capacity is therefore estimated at 74,700 tons/year, based on the results in February 1990. For the ground for this capacity, refer to Attachment IV-1-1.

1.1.7 Other Preconditions

These preconditions are described in the Progress Report presented to SEKA during the field survey.

1.2 Management and Operational Technology

Problems in management and operational technologies have already been pointed out in Chapter III, 2. The proposed renovations and their goals cannot be attained only by improved equipment, but improvement in management and operational technologies is indispensable.

The proposed renovations are aimed at producing products whose quality is comparable to that of products on international markets and paving the way for a strong enterprise that has as much earning power and competitiveness as private enterprises. It is important therefore to execute renovations by actively improving present conditions and solving problems.

The proposed renovations are premised on the assumption that improvement in equipment and improvement in management and operational technology be simultaneously implemented.

2. Outline of the Alternatives

2.1 Case 1

The renovations in Case 1 have been planned based on the following conditions.

(1) Investment is aimed at improvements needed for full and balanced utilization of capacity of the existing equipment.

As a result of the survey, it has been concluded that output of 100,000 tons/year of 45 grams/square meter newspaper is appropriate as the goal.

(2) Especially the paper machine needs the following improvements to attain the goal.

Renewal of the stock inlet
Introduction of the on top wire system
Strengthening of the press part
Renewal of the drier hood
Renewal of the driving equipment
Renewal of the roll wrapping machine

(3) Product quality should be improved by solving various problems pertaining to quality to gain international competitiveness.

(4) To realize this, the following improvements are needed regarding raw materials.

Strengthening every screen by introducing the slit type
Introduction of a centrifugal cleaner
Strengthening the refiner system
Introduction of a shive analyzer

(5) De-inked pulp to be newly introduced is always maintained at 85 BDT/day and preferentially produced and consumed, and thereby contributes to log resources conservation.

(6) A white water filter is newly introduced to heighten the rate of recycled white water within the system for quality improvement, from which conservation of new feed water as well as effects of reduced waste water can also be expected.

DIP waste water is treated in the biochemical treatment system. Flammable waste is planned to be incinerated.

2.2 Case 2

The renovations in Case 2 have been planned based on the following conditions.

(1) Research on the newspaper market in Turkey has revealed that imports, which now amount to about 40,000 tons, will exceed 70,000 tons in 1995. Output is set at 130,000 tons in Case 2, with a view to replacing imports by homemade newspaper as much as possible.

(2) However, partial remodeling cannot attain the output goal. Drastic renewal is needed except for the drier cylinder.

Introduction of the twin wire system
Renewal of the press part
Renewal of the dry part (the drier cylinder is reused.)
Renewal of the calender and reel
Renewal of the drier hood
Renewal of the driving equipment

Installation of another winder
Renewal of the roll wrapping machine

(3) Regarding other renovations, Case 2 involves almost the same renovations as Case 1, except the difference in output.

3. Renovation Execution Schedule

3.1 Major Renovations

3.1.1 Logs and Processing Process

(1) Adjustment of Log Acceptance and Backlog

The amount of logs to be supplied is decided in a contract concluded on an annual basis between SEKA and the Ministry of Agriculture and Forestry, and they say it cannot be changed halfway. This should be changed to a contract that allows semiannual or quarterly adjustment of the amount. Doing so would be desirable also from the viewpoint of effective use of resources.

It is also necessary to make active adjustment according to conditions, not only at Aksu mill but also at all SEKA units.

(2) Logs are heaped up, as shown in Fig.1, leaving only two roads for conveyance by truck.

For example, roads and divisions should be prepared, as shown in Fig.2, and logs should be heaped in sequence of date of acceptance in these divisions, according to species and length. And they should be taken from the opposite side of the older heap.

(3) Fixing the ratio of blending

It is pine logs that are posing a problem. A large quantity of blended pines causes lack of uniformity of logs.

It is desirable to mix the necessary ratio of pines to a truck load of spruces. From the point of view of operation, it would be convenient to use the storage equipped with a crane and located at the slasher entrance as the pine yard.

(4) Pivot Stacker Yard

GP logs cut into 1-meter pieces are said to have seldom become necessary. The quantity of these logs therefore should be reduced as much as possible. Excess logs are used for heaping up other logs.

The nozzle attached to the pivot stacker should be highly utilized to prevent drying (the Team never saw sprinkling from it).

(5) Seven showers are installed to improve the moisture content of logs immersed in the seasoning pond. These showers are effective to increase the moisture content and reduce its dispersion. Installation of several more showers is planned at the pond entrance.

More than 35% moisture content is said to be necessary for GP logs in general (borrowed from The Latest Method of Groundwood Pulp Manufacturing, 1958).

(6) Rotary Screen for Drum Barker Waste Water Disposal

Related equipment including the screen and belt conveyor undergoes repairs. If there is any problem with screen filtrate, wire mesh needs review for filtrate recycling.