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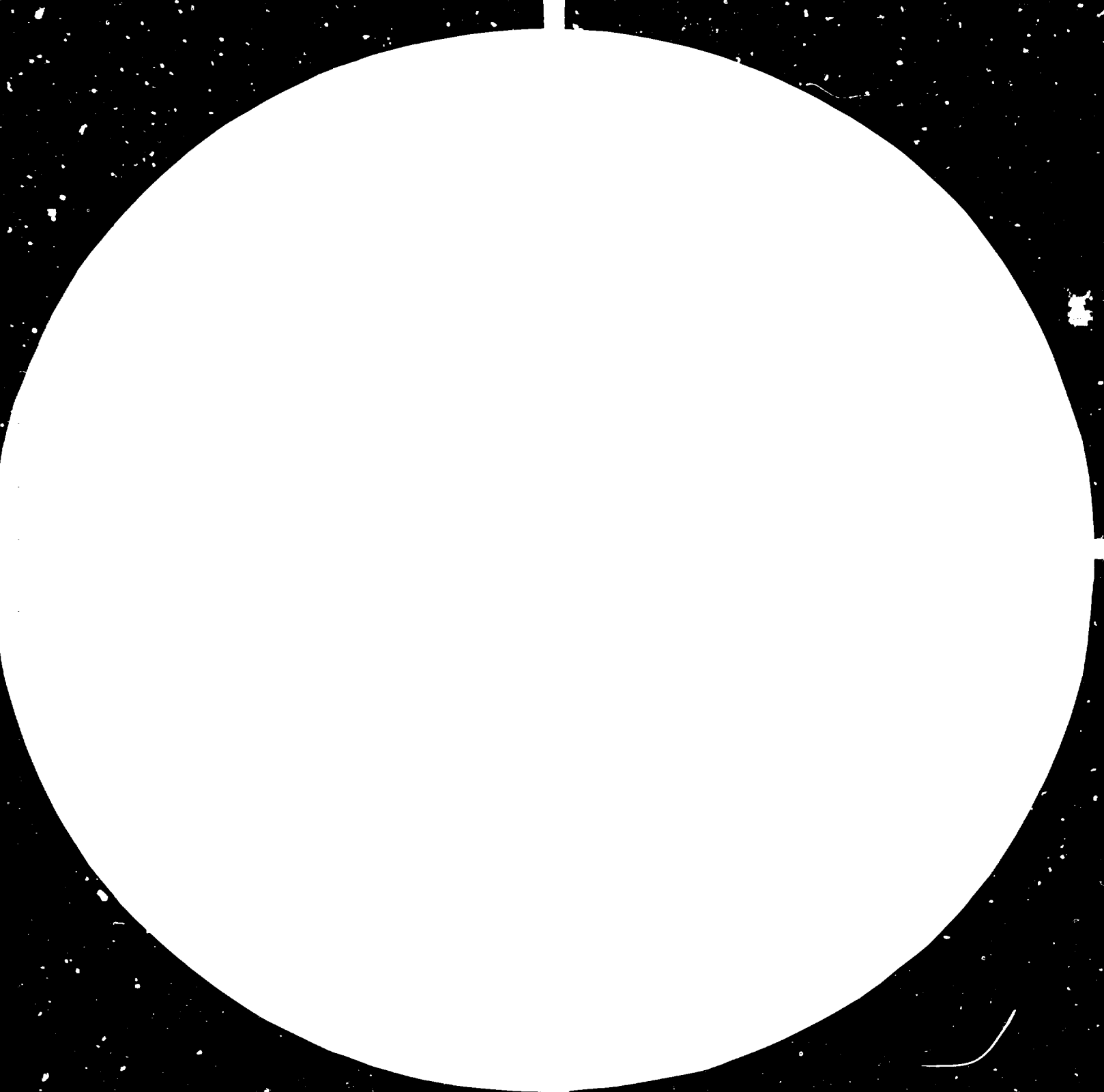
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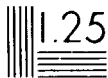
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THE SITUATION OF THE SYNTHETIC FIBRE INDUSTRY IN TURKEY*

by

Halûk Yikilmaz**

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IA - POLYESTER YARN AND FIBRE PRODUCTION CAPACITIES IN TURKEY

1. Existing situation in polyester industry

Established capacities for polyester fibre and polyester yarn in Turkey are indicated as follows :

COMPANY NAME	POLYESTER YARN CAPACITIES	POLYESTER FIBRE CAPACITIES	
SASA	9000 Ton/year	34.000 ton/year	
FILAMENT	4785 "	-	
POLYLEN	5000 "	-	
SANCAK TUL	5500 "	-	
SİFAŞ	4000 "	-	
MNS	2100 "	7.000 Ton/year	
TOTAL	30.285 Ton/year	41.000 ton/year	

MNS have been stopped since 1979 due to the difficulties to import TPA and ES from the foreign countries.

2. Additional predetermined capacities

a) SASA provided allowance for 9000 ton/year polyester yarn and 14.000 ton/year polyester fibre establishment.

b) FILAMENT provided allowance for 4785 ton/year polyester yarn additional establishment.

c) AR Sentetik Kimya Sanayii A.Ş provided allowance for 6900 ton/year polyester yarn establishment.

Predetermined times for trial operations for these establishments are for SASA 1982 (for yarn) , 1979 (for fibre) ; for FILAMENT 1980 and for AR Sentetik 1979

If we consider these establishments will start operation in 1982 and within 1-2 years reach their exact capacities, for 1984 approximated polyester fiber and polyester capacities are indicated as follows:

	EXISTING CAPACITIES AT THE END OF 1978	APPROXIMATED CAPACITIES IN 1984
POLYESTER YARN	30.285 ton/year	50.970 ton/year
POLYESTER FIBRE	41.000 ton/year	55.000 ton/year
TOTAL	71.285 ton/year	105.970 ton/year

III - PRODUCTION , IMPORT , EXPORT AND CONSUMPTION

Production, import, export and consumption values for polyester fibre and polyester yarn are indicated in the following table.

YEARS		1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
PRODUCTION	POLYESTER YARN	125	462	632	2302	3731	5826	2854	5853	12700	17200
	POLYESTER FIBRE	-	3360	6106	8080	11374	14224	16232	16000	26600	27485
	TOTAL	125	3822	6745	10382	15155	20060	19086	22853	39300	44685
IMPORT	POLYESTER YARN	279	804	849	789	411	611	1077	1127	367	285
	POLYESTER FIBRE	5586	2304	424	-	-	123	307	4281	634	25
	TOTAL	6865	3108	1273	789	411	734	4164	5408	1091	310
EXPORT	POLYESTER YARN	-	-	-	-	-	-	-	-	-	-
	POLYESTER FIBRE	-	1,5	233	500	975	1299	-	456	2083	1515
	TOTAL	-	1,5	233	500	975	1299	-	456	2083	1515
CONSUMPTION	POLYESTER YARN	1404	1266	1488	3091	4192	6437	3931	7980	13007	17405
	POLYESTER FIBRE	5586	5964	6530	7580	10759	13048	19319	19825	25131	25995
	TOTAL	6990	7230	8018	10671	14951	19485	23250	27805	38138	43400

III A - DEMAND PROJECTION

Demand projection between 1976 and 1985 is indicated as follows :

YEARS	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
POLYESTER YARN	9340	10920	12780	14950	17200	19770	22740	26150	29550	33400
POLYESTER FIBRE	23000	26680	30950	35900	41290	47480	54600	62790	70950	80180
TOTAL	32340	37600	43730	50850	58490	67250	77340	88940	100500	113680

When preparing this demand projection old years situations, producers considerations, future capacity level of Turkey and general situations of the world markets are considered and following demand increase speeds are accepted.

YEARS	POLYESTER YARN	POLYESTER FIBRE
Intermediate value between 1975-1979	% 17	% 16
Intermediate value between 1979-1983	% 15	% 15
Intermediate value between 1983-1987	% 13	% 13

Considering real consumption production values for polyester yarn 17.500 ton/year and for polyester fibre 26.000 ton/year (total 43.500 ton/year) and using above mentioned demand increase speeds we can obtain following demand projection (TON)

YEARS	POLYESTER YARN	POLYESTER FIBRE	TOTAL
1978	20.475	30.160	50.535
1979	23.956	34.484	58.782
1980	27.549	40.233	67.782
1981	31.681	46.268	77.949
1982	36.434	53.209	89.643
1983	41.895	61.190	103.089
1984	47.346	69.148	116.494

If we compare the values in this demand projection at 1984 (namely 47.346 polyester yarn + 69.148 polyester fibre = total 116.494 ton polyester) with established capacity at 1984 it is understood that most of the demands will be provided by means of conventional productions. But there will be only 11,000 ton/year less production.

If we consider polyester yarn production and polyester fibre production separately in 1984 polyester yarn production capacity will be enough for conventional demand but there will be 15,000 ton/year less production for polyester fibre production capacity.

IVA - POLYESTER RAW MATERIALS AND THEIR PROVIDING POSSIBILITIES

The main raw material for polyester fibre and polyester yarn is dimethyl-tereftalat (DMT) or tereftalic acid (TPA). For the production of one ton polyester cips 0,9 ton TPA or 1,05 - 1,1 ton DMT is used. 1,05 ton cips are consumed. For 1 ton polyester yarn, But 1,03 ton cips are consumed during the production of 1 ton polyester fibre. Second raw material for polyester production is ethylene glycol (EG). 0,40 - 0,44 ton EG are used for the production of 1 ton polyester cips. The imported values for the raw materials used polyester production in Turkey are indicated in the following table :

(TON)

RAW MATERIAL	YEARS									
	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
DMT	143	6294	8311	11095	11095	15337	22490	23125	-	-
TPA	4	7	-	179	34	189	539	2468	7459	7839
SG	828	2969	4276	3964	5854	6528	10429	11282	13745	25750

But in Turkey only SASA have been used DMT as the main raw material in polyester yarn and fibre production. DMT demands were provided by means of import until 1977. After that time with 60,000 ton/year capacity DMT production units of SASA company was commenced. And now in addition to reply local demands, SASA is exporting DMT to the foreign countries.

If we consider that the new polyester yarn and fibre investments of SASA will be commenced in 1982 with % 25 capacity, in 1983 will reach a % 50 capacity and in 1984 will reach a % 100 capacity.

In this case the total cips demands for old and new establishments are indicated in the following table :

(TON)

		YEARS						
		1978	1979	1980	1981	1982	1983	1984
POLYESTER YARN	EXISTING	9.000	9.000	9.000	9.000	9.000	9.000	9.000
	NEW	-	-	-	-	2.250	4.500	9.000
	TOTAL	9.000	9.000	9.000	9.000	11.250	13.500	18.000
CIPS DEMAND		9.450	9.450	9.450	9.450	11.813	14.175	18.900
POLYESTER FIBRE	EXISTING	34.000	34.000	34.000	34.000	34.000	34.000	34.000
	NEW	-	-	-	-	3.500	7.000	14.000
	TOTAL	34.000	34.000	34.000	34.000	37.500	41.000	48.000
	CIPS DEMAND	35.020	35.020	35.020	35.020	38.625	42.230	49.440
TOTAL CIPS DEMAND		44.470	44.470	44.470	44.470	50.438	56.405	68.340
NECESSARY DMT VALUES		48.917	48.917	48.917	48.917	55.482	62.046	75.174

This table indicates that the demand of DMT in Turkey will be increased to 75,000 ton/year. Therefore 60,000 ton/year existing capacity of SASA will not be enough at that time.

Other polyester yarn and fibre producers in Turkey are using TPA as the main raw material. Considering approximately increased capacities of other polyester producers between 1978-1984, in the following table necessary TPA values are indicated according to the total polyester cips demands :

(TON)

		YEARS						
		1978	1979	1980	1981	1982	1983	1984
POLYESTER YARN	EXISTING	21.285	21.285	21.285	21.285	21.285	21.285	21.285
	NEW	-	-	-	-	2.921	5.843	11.685
	TOTAL	21.285	21.285	21.285	21.285	24.205	27.028	32.970
	CIPS DEMAND	22.349	22.349	22.349	22.349	25.416	28.329	34.619
POLYESTER FIBRE	EXISTING	7.000	7.000	7.000	7.000	7.000	7.000	7.000
	NEW	-	-	-	-	-	-	-
	TOTAL	7.000	7.000	7.000	7.000	7.000	7.000	7.000
	CIPS DEMAND	7.210	7.210	7.210	7.210	7.210	7.210	7.210
TOTAL CIPS DEMAND		29.559	29.559	29.559	29.559	32.626	35.589	41.829
NECESSARY TPA VALUE		26.603	26.603	26.603	26.603	29.363	32.030	37.546

Until today TPA has been imported from foreign countries. And this situation will go on until the II. Petrokimya anlage (Aliaga) will be commenced in 1984. Here 70.000 ton/year TPA will be produced. After that the whole local demands will be replied easily.

Necessary EG values for polyester yarn and fibre productions are indicated in the following table :

(TON)

		YEARS						
		1978	1979	1980	1981	1982	1983	1984
EG VALUES THAT WILL USE DMT		19.567	19.567	19.567	19.567	22.193	24.818	30.070
EG VALUES THAT WILL USE TPA		11.824	11.824	11.824	11.824	13.050	14.236	16.732
TOTAL EG VALUES		31.391	31.391	31.391	31.391	35.243	39.054	46.802

Also EG has been imported until today. This will go on until the II. Petrokimya anlage (Aliaga) will be commenced in 1984. Here 60.000 ton/year EG will be produced.

And initial raw material of DMT, namely P-ksilen will be imported also until the II. Petrokimya anlage will commence.

IB - ACRYLIC FIBRE PRODUCTION CAPACITIES IN TURKEY

1. Established capacities

The evaluation of the acrylic fibre established capacities are indicated in the following table :

COMPANIES	1972	1973	1974	1975	1976	1977	1978
AKSA	5.250	5.250	10.000	10.000	40.000	40.000	40.000
YALOVA ELYAF	-	-	-	-	-	7.000	7.000
TOTAL	5.250	5.250	10.000	10.000	40.000	47.000	47.000

2. Predetermined additional capacities

-AKSA has reached a 48.000 ton/year capacity in 1979 and 56.000 ton/year additional capacity will be commenced in 1982.

-YALOVA ELYAF SANAYII was applied to provide allowance for 5500 ton/year additional capacity in 1979, but this allowance was not taken.

-SASA was attempt to provide allowance for 20.000 ton/year acrylic fibre establishment but then SASA was not able to deliver project, therefore at the end of 1978 this allowance was stopped.

IIB - PRODUCTION VALUES FOR ACRYLIC FIBRE

Practical production values for AKSA and YALOVA ELYAF are indicated in the following table :

YEARS \ COMPANY	AKSA	YALOVA ELYAF	TOTAL
1972	6.000	-	6.000
1973	9.000	-	9.000
1974	10.000	-	10.000
1975	10.000	-	10.000
1976	17.000	-	17.000
1977	29.000	6.000	35.000
1978	35.000	4.000	39.000
1979	40.000 ^X 45.000 ^{XX}		

X This value was guaranteed by AKSA

XX This value was approximated by AKSA

III B - IMPORT VALUES

Imported acrylic fibre values between 1972 and 1978 are indicated in the following table;

YEARS	IMPORTED VALUES
1972	6,523
1973	2,867
1974	12,337
1975	8,871
1976	12,107
1977	6,072
1978 ^x	171 250

x In 1978 imported acrylic fibre values were decreased.

IV B - EXPORTED VALUES

In 1978 2000 ton/year acrylic fibres were exported to foreign countries.

According to the AKSA managers opinion there is possibility to export 10,000 or 15,000 ton/year acrylic fibre, but capacity of the plant is not enough.

V B - CONSUMPTION OF ACRYLIC FIBRE

Local consumption of acrylic fibres is indicated in the following tables
(Production + import - export = consumption)

YEARS	CONSUMPTION VALUES
1972	12,523
1973	11,867
1974	22,337
1975	18,871
1976	29,107
1977	41,072
1978	37,250

VIB - DEMAND PROJECTION

Demand projection of acrylic fibre in Turkey is indicated in the following table :

(Production + import - export = consumption)

YEARS	CONSUMPTION VALUES
1976	22.650
1977	27.170
1978	32.610
1979	39.130
1980	45.780
1981	53.570
1982	62.670
1983	73.320
1984	82.850
1985	93.620
1986	105.790
1987	119.550

When preparing this table following predetermined demand speeds are accepted :

Between 1975 - 1979 yearly % 20
 " 1979 - 1983 yearly % 17
 " 1983 - 1987 yearly % 13

- In 1975 the real demand level was 19.000 ton/year
 In 1976 real demand level was 29.107 ton/year instead of 22.650 ton/year
 Between 1975 and 1976 demand increased by % 53 instead of % 20 .
 In 1977 the real demand value is 41.072 ton/year instead of 27.107 .
 Between 1976 and 1977 demand increase % is % 41 instead of % 20 .
 In 1976 and 1977 the demand of acrylic fibre was more than the approximated demand values.

In 1978, acrylic import was bounded, therefore there is a relative demand decrease in this year.

That's why if we accept the real demand value in 1978 as 37.000 ton/year and using above mentioned yearly demand increase speeds demand projection for acrylic fibre is indicated in the following table : (Between 1979-1985)

YEARS	ACRYLIC FIBRE DEMAND
1979	44.400
1980	51.948
1981	60.779
1982	71.111
1983	83.200
1984	94.016
1985	106.238

VIII - NECESSARY ESTABLISHMENTS ACCORDING TO ESTIMATED DEMAND :

If we compare established capacities with the above mentioned demand projection, in 1985 there will be approximately 40,000 - 50,000 ton/year less production. If we consider export possibilities also, it is necessary to establish a new acrylic plant with 50,000 ton/year capacity. That's why now AKSA has a new modification. We hope that at the end of 1982 AKSA will commence it with 56,000 ton/year additional capacity.

VIIIB - ACRYLIC FIBRE RAW MATERIALS :

1. ACRYLONITRYL

Until now this main raw material for acrylic has been imported. This will go on until the II. Petrokiaya Komplex (Aliaga) will be commenced in 1984. 1,01 ton acrylonitril is necessary for the production of 1 ton acrylic.

If we want to reply the whole local demand with local production, necessary acrylonitril values are indicated in the following table :

YEARS	ACRYLONITRYL DEMANDS
1979	44.844
1980	52.467
1981	61.387
1982	71.822
1983	84.032
1984	94.956
1985	107.300

The production program situated in II. Petrokiaya Komplex is indicated in the following table :

YEARS	PRODUCTION PROGRAM
1979	--
1980	--
1981	55.000
1984	52.500
1983	63.000
1984	70.000
1985	70.000

If we compare the demands of acrylonitril between 1979 and 1985, it is obvious that there is not any possibility to reply all the local acrylonitril demands. After then by reason of some less possibilities, above mentioned production program is prolonged 3 years. In this case it will be commenced in 1984 instead of 1981.

2. DIMETHYL FORMAMID OR DIMETHYL ACETAMID

The second important raw material used in acrylic fibre production is dimethyl formamid or dimethyl acetamid. So far this raw material has been imported and there is not any attempt to establish some plants for the production of above mentioned raw materials. Therefore we hope that it will be provided by means of import also in future.

The necessary dimethyl formamid value for 1 ton acrylic fibre production is 0.07 tons.

If we think to reply all the local acrylic fibre demands by means of production, necessary DMF values are indicated in the following table :

(TON)

YEARS	DMF DEMANDS
1979	3.108
1980	3.636
1981	4.255
1982	4.978
1983	5.824
1984	6.581
1985	7.437

IG - POLYAMID FIBRE AND YARN CAPACITIES IN TURKEY

1. ESTABLISHED CAPACITIES

Established polyamid fibre and yarn capacities are indicated in the following table :

COMPANIES	POLYMERIZATION		FIBRE		YARN		
	Ton/day	ton/day	Ton/day	Ton/day	Ton/day	Ton/day	
SIFAS	Ny 6	22,8	8208	11,0	3960	19,6	7056
	Ny 66	4,5	1620	-	-	1,0	360
INSA		17,0	6120	-	-	14,0	5040
						3,0	1080
TEKST IPLIK		13,0	4680	-	-	13,0	4680
TOTAL	Ny 6	52,8	19008	11,0	3960	49,6	17856
		4,5	1620			1,0	360

2. DEMAND PROJECTION

Demand projection for polyamid fibre and yarn is indicated in the following table:

(TON)

YEARS	NAME	POL YAMID YARN	POLYAMID FIBRE	NYLON CORD YARN	TOTAL POLYAMID
1976		9.900	4.000	4.000	17.900
1977		10.600	4.600	6.000	21.200
1978		11.400	5.300	7.200	23.900
1979		12.200	6.100	8.000	26.300
1980		13.100	7.000	10.000	30.100
1981		14.000	8.000	11.000	33.000
1982		15.000	9.200	13.600	37.800
1983		16.100	10.200	15.000	41.300
1984		17.200	11.200	15.600	44.000
1985		18.400	12.300	16.000	46.700
1986		19.700	13.500	16.000	49.200
1987		21.000	14.800	16.000	51.800

ID - ADDITIONAL PREDETERMINED CAPACITIES ACCORDING TO THE 4. PLANNING PERIOD (1977 - 1982) FOR FIVE YEARS

In 4. planning period between 1977 and 1982 predetermined additional synthetic capacities are indicated in the following :

1. For Polyamid investments

- a) Polyamid fibre - 10.000 ton in 1979
- b) Nylon cord yarn - 15.000 ton in 1980

2. For Polyester investments

- a) Polyester fibre - 20.000 ton in 1981

3. For acrylic investments

- a) Acrylic fibre - 20.000 ton in 1981

If above mentioned capacities can add during 4. planning ^{period} (namely between 1977 - 1982) this will be enough for local demands.

But during 5. planning period 1982 - 1987 following additional capacities will be usefull.

- a) 4000 ton/year polyamid yarn investment in 1985
- b) 40.000 ton/year polyester fibre capacity between 1983 and 1985
- c) 20.000 ton/year polyester yarn capacity between 1985 and 1987
- d) 40.000 ton/year acrylic fibre capacity (with polymerization unit) in 1984

By the reason of above mentioned additional fibre and yarn capacities between 1977 and 1987 following polymerization additional capacities will be also useful.

- a) 10.000 ton /year nylon - 6 in 1979
- b) 15.000 ton/year nylon - 66 in 1980
- c) 10.000 ton/year nylon - 6 polymerization in 1985
- d) Polyester polymerization

20.000 ton/year in 1982
30.000 ton/year in 1984
30.000 ton/year in 1986

IE - CAPACITY DISTRIBUTION OF SYNTHETIC FIBRE AND YARN ESTABLISHMENTS IN TURKEY IN 1981

In the attached table all present synthetic fibre and yarn investments are indicated.

IF - DEMAND PROJECTION CURVES

In the attached diagrams demand projections are indicated separately for synthetic fibre and yarns in Turkey.

CAPACITY DISTRIBUTIONS OF SYNTHETIC YARN AND FIBRE
ESTABLISHMENTS IN TURKEY AT 1981

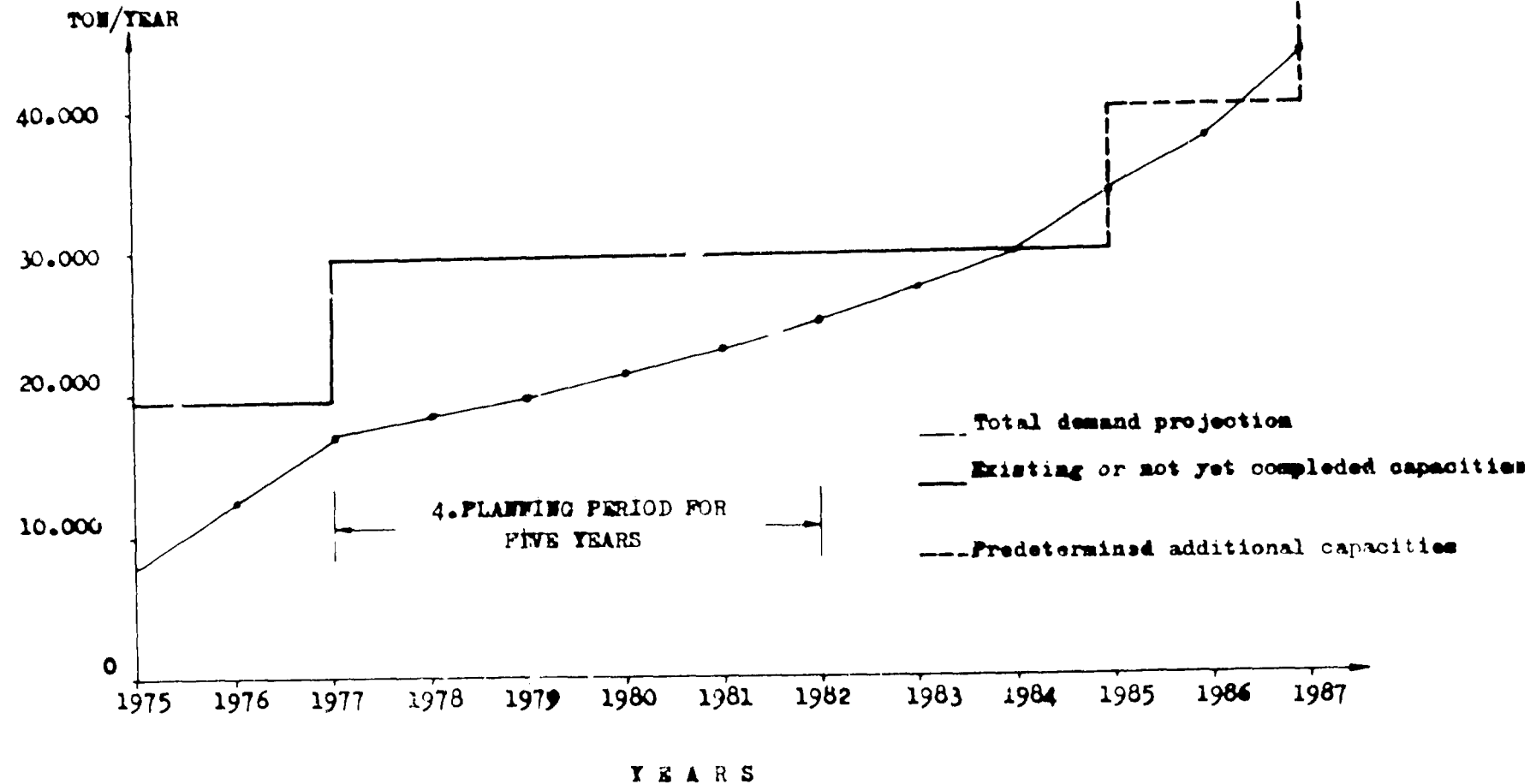
POLYESTER	COMPANIES	POLYMERIZATION		FIBRE		YARN		NOT
		TON/DAY	TON/YEAR	TON/DAY	TON/YEAR	TON/DAY	TON/YEAR	
	SASA	190 208.0	43000 75000	940 1330	34000 48000	250 570	9000 24000	
	FILEMENT	150 300	5400 10800	200	7200	150 300	5400 10800	Cips will be bought for fibres
	POLYLEN	138	5000	-	-	138 160	5000 5760	Yearly 800 ton cips will be bought
	SİFAŞ	150	5400	-	-	130 170	4680 5400	
	MINSABUNCU	120	4320	70	2520	50	1800	
	SANCAKTUL	150	5400	-	-	150	5400	
	NERGİZ	-	-	-	-	130	4680	Necessary cips will be bought
	TOTAL →	1898 2938	68520 105920	1010 1600	35520 57720	998 1610	35960 57840	

POLYAMID	COMPANIES	POLYMERIZATION		FIBRE		YARN		NOT
		TON/DAY	TON/YEAR	TON/DAY	TON/YEAR	TON/DAY	TON/YEAR	
	SİFAŞ Ny 6	228	8208	110	3960	196	7056	
	SİFAŞ Ny 66	45	1620	-	-	10	360	
	INSA	170	6120	-	-	140 30	5040 1080	31/day teksture carpet yarn
	TEKSIPLİK	130	4680	-	-	130	4680	
	TOTAL Ny 6	528 .. 5	19008 1620	110	3960	496 10	17856 360	

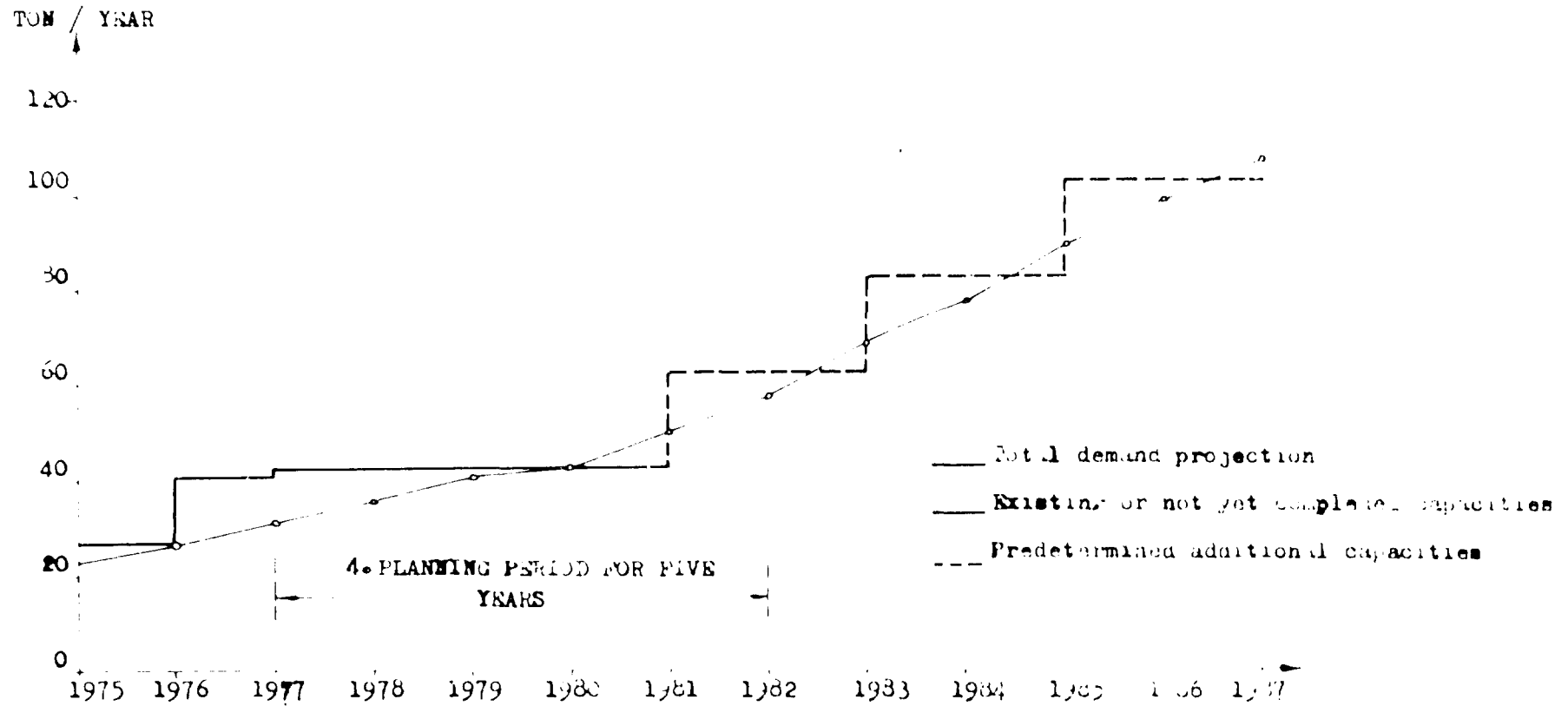
AKRİLİK	COMPANIES	POLYMERIZATION		FIBRE		YARN		NOT
		TON/DAY	TON/YEAR	TON/DAY	TON/YEAR	TON/DAY	TON/YEAR	
	AKSA	330 1555	46000 56000	130 1555	46000 56000			
	YAL AKRİLİK	220	8000	220	8000			
	TOTAL	1550 1775	56000 64000	1550 1775	56000 64000			

GEN TOTAL	4021 5286	145148 19048	267 358	96380 125680	1504 2116	54176 76056	
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POLYESTER YARN TOTAL DEMAND PROJECTION
 EXISTING (OR ERECTIONS ARE GOING ON) AND
 PREDETERMINED ADDITIONAL CAPACITIES

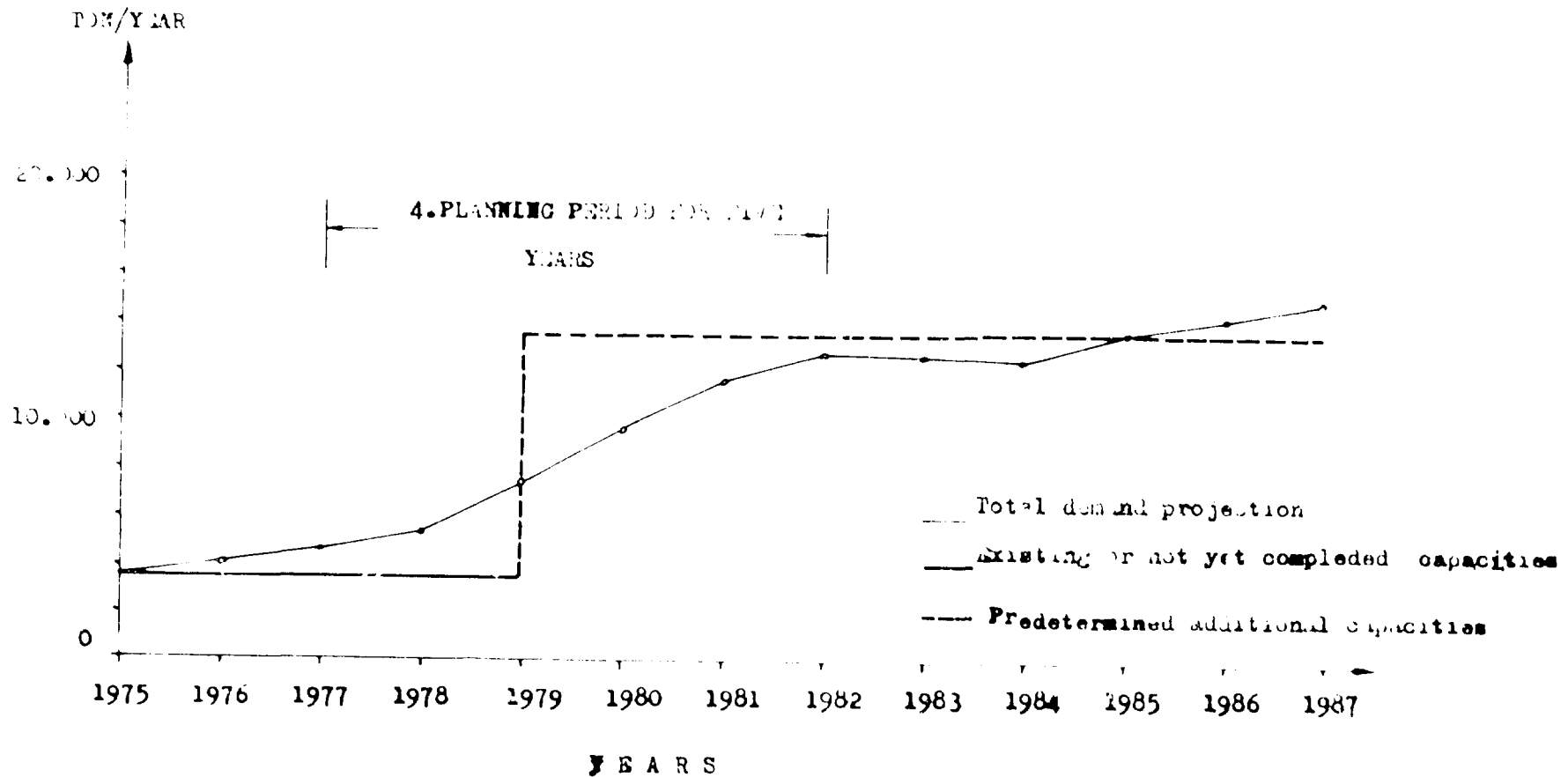


POLYESTER FIBRE TOTAL DEMAND PROJECTION -
 EXISTING (OR ERECTIONS ARE GOING ON) AND
 PREDETERMINED ADDITIONAL CAPACITIES

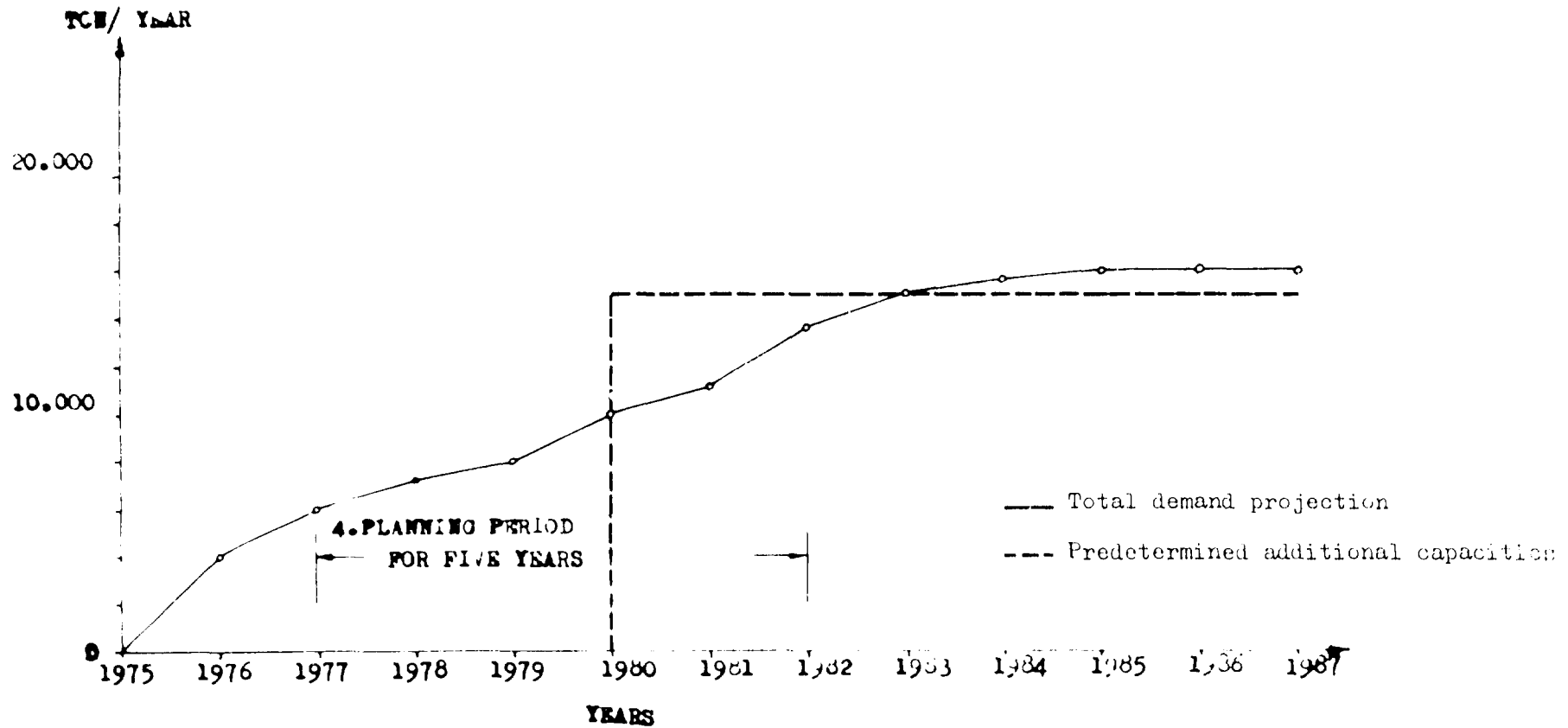


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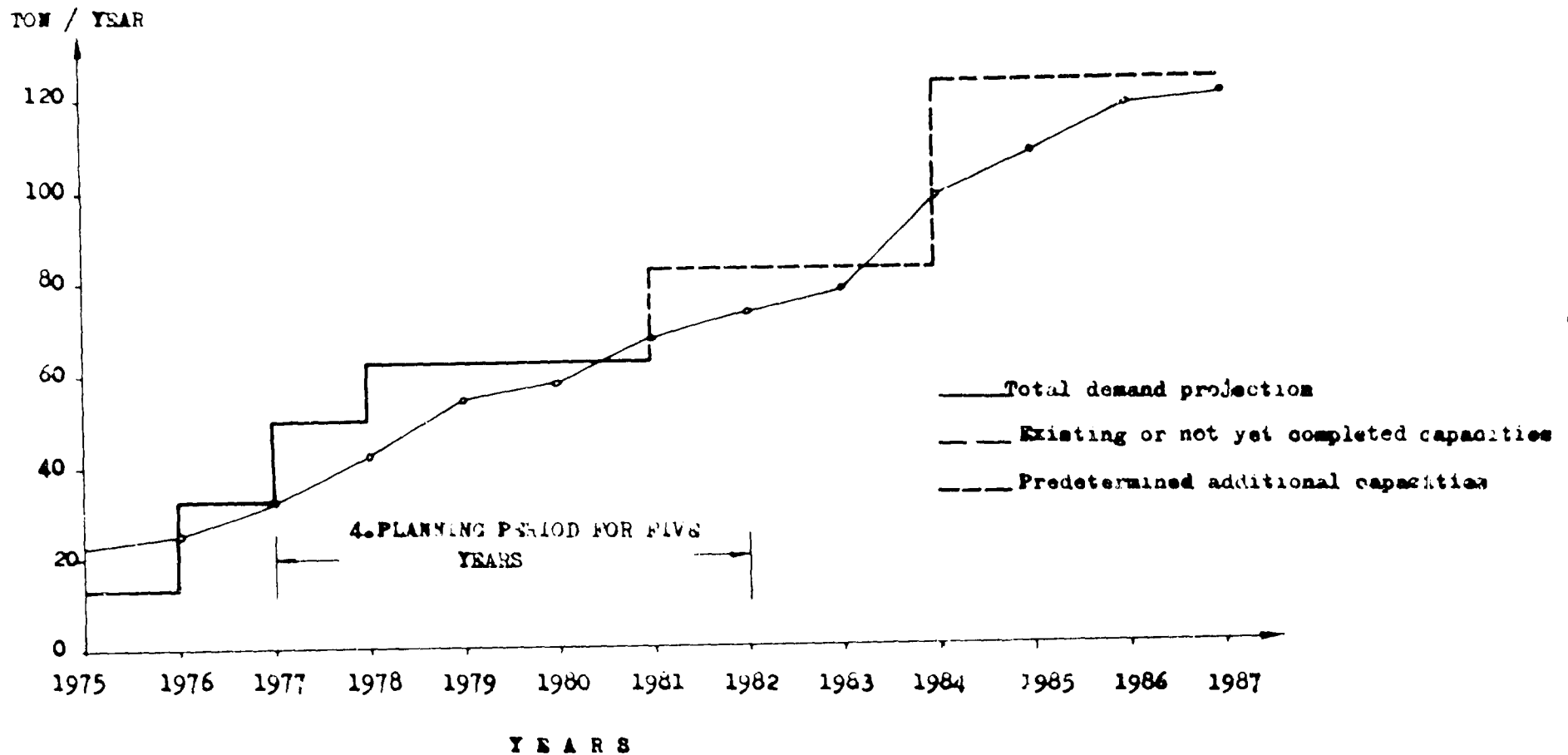
POLYAMID FIBRE TOTAL DEMAND PROJECTION EXISTING AND PREDETERMINED ADDITIONAL CAPACITIES



NYLON CORD YARN TOTAL DEMAND PROJECTION PREDETERMINED ADDITIONAL CAPACITIES



ACRYLIC YARN TOTAL DEMAND PROJECTION EXISTING (OR ERECTIONS ARE GOING ON) AND PREDETERMINED ADDITIONAL CAPACITIES



POLYAMID YARN TOTAL DEMAND PROJECTION EXISTING AND PREDETERMINED ADDITIONAL CAPACITIES.

