FOURTH PLAN

REPORT OF THE WORKING GROUP ON

MACHINE TOOLS

(GROUP VI—JULY, 1964)

OUP ON MACHINERY INDUSTRIES

REPORT OF THE WORKING GROUP FOR MACHINE TOOLS (GROUP VI)

1. *INTRODUCTION*

Pursuant to the decision taken at the fifth meeting of the Planning Group for Machinery Industries held on 18th September, 1963, a number of Working Groups were constituted. One of these, Group VI was for the Machine Tool industry.

1.1. *Constitution of the Working Group*

Shri S. M. Patil	*Chairman*
Shri A. K. Ghosh	
Shri T. R. Gupta	
Shri V. M. Meswani	
Dr. C. A. Phalnikar	
Shri V. Nimbkar	
Shri D. S. Mulla	
Shri B. N. Bhargava	
Shri K. Rajagopalan	
Shri R. K. Gejji	*Convener.*

1.2. *Terms of Reference*

The General terms of reference of the Working Group were:—

(i) To make an estimate of the requirements of equipment falling within the scope of the Working Group, as they are relevant to the establishment of capacity for the manufacture of such equipment during the Fourth Plan. In making this estimate, the requirements of replacements and possibility of exports should be taken into account.

(ii) To make an analysis of these requirements, in terms of category of equipment and value.

(iii) To work out in detail the requirements of each category of equipment, by type and by range, during each of the years of the Fourth Plan.

(iv) To recommend the capacity and production targets for 1970-71, for each category of equipment, by type and by range, to the extent indigenous manufacture is considered feasible and desirable.

(v) To make an assessment of the production of existing and projected manufacturing facilities and to work out the gaps for each category of equipment.

(vi) To investigate the best manner in which the gaps could be covered to the extent feasible and desirable by the end of the Fourth Plan; and to make specific proposals to this end, by way of expansion on new projects etc.

(vii) To make an estimate of the investment and foreign exchange on capital and maintenance account required for implementing the production programmes as recommended.

(viii) To make an estimate of power, fuel, transport and other requirements of a significant order.

(ix) To make an estimate of raw materials, components etc. required for the manufacture of such equipment and to suggest measures for the indigenous manufacture of such items.

(x) To recommend measures by which utilisation of manufacturing capacity and programmes of production in the consuming sectors are co-ordinated to the fullest extent.

(xi) To make such other recommendations as may be relevant.

1.3. *Meetings of the Working Group*

The Working Group at its first meeting in Delhi on the 2nd December, 1963, appointed a Sub-Group of following members to prepare a draft report for the Working Group.

Shri S. M. Patil.

Shri D. S. Mulla.

Shri V. Nimbkar.

Shri R. K. Gejji.

The Sub-Group met on a number of occasions in Delhi and Bombay, and a draft of the Interim Report was placed before the Working Group at its second meeting in Bangalore on the 16th January, 1964. This Report was submitted to the Ministry in January, 1964.

1.4. *Defining the term Machine Tools*

The Working Group considered it desirable, that the term Machine Tools which has so far been used in a general way should be more specifically defined.

For the purpose of this Report, Metal Working Machinery coming within the purview of the Tools Directorate, have only been considered. These Metal Working Machines are divided into two groups:—

GROUP A.—*Machine Tools*

This Group consists of all metal cutting machines and selected Metal Forming Machines. The machines covered in this Group are shown in Annexure I-A.

GROUP B.—*Other Metal Working Machinery*

This Group consists of other Metal Forming Machines, Machine Tool Accessories, Portable Tools and Wood Working Machinery. The machines covered in this Group are shown in Annexure I-B.

The definition is a practical one and adopted by D.C.T.D. For the purpose of this Report the term "Machine Tools" wherever it is used would mean only those items as come under Group A (Annexure I-A). Similarly the term "Other Metal Working Machinery" would cover items in Group B (Annexure I-B).

1.5. *Limitations*

1.5.1. It must, at the outset, be mentioned that any assessment of the likely demand for Machine Tools can, at best, only be a close estimation, as there are a number of factors which can accelerate or retard the progress of overall industrialisation of the country, and consequently the demand for machine tools. Apart from this, the relevant statistical information required is, unfortunately, in many cases inadequate, or sometimes not available.

1.5.2. *Lack of Statistical Data*

The last census of Machine Tools installed in the country was taken in 1954. This census gave the details of Machine Tools installed by groups, types, size and age.

As no reliable statistics are available of the Machine Tools installed after 1954, it is not possible, to evaluate correctly the pattern of Machine Tools now installed in the country. However, an attempt has been made, on the basis of available data of indigenous production and import, to estimate the Machine Tools installed since 1955.

1.6. *Basis of Assessment*

The last assessment of demand of Machine Tools made by the then Development Wing of Ministry of Commerce and

Industry in November 1962 laid emphasis on value both in assessing the demand and in fixing target of production. It has been found from experience that the value factor is very variable as it is influenced by the normal price increase and the higher cost for the sophisticated machines used for increased productivity. In this Report, therefore, greater emphasis has been laid on estimating the demand in terms of number correlated to the various indicative factors such as investiment in Industry, increase in installed capacity etc. Due allowance has been made for the likely average increase in the price of machine tools and also for the higher productivity expected in the costlier type of machine tools that would be installed.

1.6.1. *Indicators used*

For the assessment of likely demand of Machine Tools the following indicators have been used, it being considered that these are the major factors indicative of, or influencing the demand and likely pattern of demand, for machine tools.

1. Projection of Past Consumption.
2. Actual Consumption 1960-63 and Previous Estimate of Demand.
3. Investment in Industry during the Plan Periods.
4. Targets of Capacity in Major Machine Tool Using Industries, correlated VALUE of Machine Tools.
5. Assessment by the Perspective Planning Division.
6. Targets of Capacity in Major Machine Tool Using Industries, correlated to NUMBERS of Machine Tools.

2. *TO MAKE AN ESTIMATE OF THE REQUIREMENTS OF MACHINE TOOLS AND OTHER METAL WORKING MACHINERY*

2.1. *Estimate of demand of Machine Tools on basis of Projection of Value of past Consumption*

The figures of Consumption of Machine Tools during the period 1956 to 1960 are shown in Table I. On the basis of the actual consumption, which varies from year to year, figures of "Equivalent Consumption" have been worked out, that is,

what this consumption would have been had the rise been at a steady rate: —

TABLE I

Consumption of Machine Tools 1956-1960

(Rs. in Crores)

	Actual Consumption of Machine Tools	Equivalent Consumption of Machine Tools at constant Annual Increase of 22.5%
1956	9.57	9.57
1957	13.82	11.72
1958	15.97	14.36
1959	16.00	17.56
1960	19.39	21.54
TOTAL	74.75	74.75

TABLE II

Projection of Past Consumption of Machine Tools

(Rs. in Crores)

Year	EIGHT YEAR PERIOD		FIVE YEAR PERIOD	
	Actual	Equivalent Consumption Annual increase 23.1%	Actual	Equivalent Consumption Annual increase 27.4%
1	2	3	4	5
1956	9.57	9.57		
1957	13·82	11.81		
1958	15.97	14.53		
1959	16·00	17.88	16.00	16.00
1960	19.39	22·00	19.39	20.44
TOTAL	74.75			
1961	25.65	27.07	25.65	26.02
1962	29.83	33.31	29.83	33.15
1963	46·95	41.01	46.95	42.21
TOTAL	177.18	177.18	137.82	137.82
1961		27.07		26.02
1962		33.31		33.15
1963		41·01		42.21
1964		50.48		53.77
1965		62.14		68·50
TOTAL 1961—1965		214·01		223·65

TABLE III

Estimated Demand 1966-1970 Based on Projection of Past Demand

1	2	3	4	5
1966		76·49		87·27
1967		94·16		111.18
1968		115.91		141.64
1969		142.67		180·44
1970		175.66		229.88
TOTAL 1966-1970		604.89		750.41

2.1.1. *Eight Year Period*

It will be seen from Table II that over the 8-year period 1956-1963, the total consumption of Machine Tools was Rs. 177.18 crores. Had the demand for Machine Tools risen steadily year by year, the rate of annual increase would have been 23.1%. Based on this annual increase the equivalent consumption during these years is shown in column 3 of Table II.

Similarly considering the Five-Year Period, 1959-1963, the equivalent consumption would have been at an annual increased rate of 27.4%. The equivalent consumption for this period @ 27.4% is shown in Column 5.

The projected demand for the period 1961-1965 and 1966-70, on the basis of the two rates of increase *viz.*, 23.1% and 27.4% will be: —

Period	Projected demand at 23.1% (Rupees Crores)	Projected demand at 27.4%
1961-65	204.01	223.65
1966-70	604.89	750.41

2.2. *Estimate of demand, on basis of Actual Consumption by value in* 1960-1963 *and Previous Estimate of Demand by the Development Wing*

Estimated Demand 1961-1965—An estimate of the Demand for Machine Tools was made by the Development Wing in 1960. The estimated demand as then worked out is shown in Table IV.

TABLE IV

Estimated Demand 1961-1965 Based on Annual Increase of 17.0%

		(Rs. in Crores)
1960 ..	20.8	
1961 ..		24.3
1962 ..		28.4
1963 ..		33.2
1964 ..		38.8
1965 ..		45.3
TOTAL 1961—1965		170.0

Consumption of Machine Tools 1960-1963.—The consumption of Machine Tools, which has been assumed as the total of Machine Tools imported and Machine Tools manufactured, for the years 1960 to 1963 is shown in Table V.

The estimated demand and actual consumption of Machine Tools for the years 1960-1963 are shown in Table VI.

TABLE V

Machine Tools: Imported and Indigenous 1960-1963

Year	Imported			Indigenous Production		
	Numbers	Average price Rs.	Value Rs. Crores	Numbers	Average price Rs.	Value Rs. Crores
1960	8,225	16,100	13.21	5,332	11,600	6.18
1961	11,920	15,000	17.89	8,511	9,100	7.76
1962	10,706	17,700	18.95	10,293	10,600	10.88
1963	10.399	30,300	31.51	11,058	14,000	15.44

TABLE VI

Machine Tools: Consumption and 1962 Estimates

Year	Total actual consumption			Estimated demand		Variation	
	Number	Average price Rs.	Total value Rs. crores	No.	Total value Rs. crores	Value Rs. crores	%
1960	13,557	14,300	19.39		20.80	— 1.41	—6.8
1961	20,431	12,600	25.65		24.30	+ 1.35	+ 5.6
1962	20,999	14,200	29.83		28.40	+ 1.43	+ 5.0
1963	21,457	21,890	46.95		33.20	+13.75	+41.4
TOTAL 1961-63	62,887	16,287	102.43		85.90	+16.53	+19.3
1964					38.80		
1965					45.30		
1961-1965				16,000	170.00		

The variation in estimated demand over the period 1960 to 1962 is:

Actual	74.87 crores
Estimated	73.50 crores
Difference	+1.37 crores
% Difference	+1.86 %

Whilst the variation between actual and estimated consumption by value over the years 1960-1962 is as low as 1.86% the variation in 1963 is over 41.4%.

Analysing the reasons for this steep rise in value of Machine Tools consumed, it can be seen that—

(i) whilst the number of imported Machine Tools has gradually decreased over the last three years, the average price of the imported Machine Tool has increased. The increase in average price between 1962 and 1963 is as high as 71%, whereas the number of Machine Tools has actually declined;

(ii) whilst the number of indigenous Machine Tools consumed has arisen by only 7.5%, the increase in average price of the Machine Tools between 1962 and 1963 has risen by 32%;

(iii) the increase in the average price of the imported Machine Tool may be due to the relatively high price of machines imported and also due to some heavy machine tools imported for the Heavy Engineering Projects; and

(iv) the increase in price of the indigenous Machine Tool is to an extent accounted for by increased production of Machine Tools of relatively higher value and of modern design.

In the absence of any adequate and reliable statistics of imports, or any information of the out-of normal demands for defence, it is difficult to say whether the trend in the demand of higher cost of Machine Tools will continue. and whether to that extent, affect the future estimates.

2.2.1. *Estimate based on consumption of 1963 considered abnormal.*

If, however, the consumption of Machine Tools in 1963 is considered abnormal, and that demand in 1964 and 1965 would again be normal, then, based on the 17% increase in annual demand assumed for the period 1961-1965, in Table IV the estimated demand for the five year period 1966-1970 would be as shown in Table VII.

TABLE VII

Estimated Demand 1966-1970

(Based on Actual Consumption of 1963 Considered Abnormal)

(Rs. in crores)

		% increase 17.0%
1965	45.3	
1966		53.00
1967		62.00
1968		72.50
1969		84.80
1970		99.20
	TOTAL	371.50

2.2.2. *Estimate taking consumption of machine tools for* 1963 *as being indicative of future trend.*

Taking the Machine Tool consumption during 1961-63 as being normal and as indicative of future trend, then the estimated demand will be as shown in Table VIII:

TABLE VIII

Estimate of Demand 1966-70 Based on Actual Consumption of 1961-63

(Rs. in Crores)

	Actual consumption		Equivalent consumption (30.1% increase)	
1961	25.65		25.65	
1962	29.83		33.37	
1963	46.95		43.41	
TOTAL 1961-63		102.43		102.43
1964			56.48	
1965			73.48	
TOTAL 1961-65				232.39
1966			95.60	
1967			124.37	
1968			161.80	
1969			210.50	
1970			273.86	
			866.13	

As seen from Table VIII if the actual consumption for 1963 is taken as indicative of the future trend, then the estimate for consumption of Machine Tools for 1961-65 will be Rs. 232.39 crores and the estimated demand for 1966-1970 would be Rs. 866.13 crores.

2.3.0. *Estimate of Value of Demand Correlated to Investment in Industry.*

The Planning Commission has in its various publications given figures of, Plan Outlay, Investment in Industry, and Additional Capacity of various Industries, for the First and Second Plan and Targets for the Third and Fourth Plan.

2.3.1. *Investment in Plan Outlay and Investment in Industry*

The actual and the targets of the Plan outlay, the Investment in Industry, the Additional Capacity in Major Machine Tool Using Industries (MMTUI). *See* Annexure II and the Additional Machine Tools installed is shown in Table IV.

The figures in brackets are the percentage increase or decrease over the previous year.

TABLE IX

Plan Outlay—Investment in Industry & Machine Tools

(Rs. Crores)

Plan Period	Plan Outlay	Investment in industry	Additional Capacity in MMTUI	Additional Mc. Tools Installed
	1	2	3	4
1st Plan 1951-55	3,360 (100·9%)	306 (349.7%)	77.66 (305.8%)	19.58 (281.8%)
2nd Plan 1956-60	6,750 (51.1%)	1,376 (76.0%)	315.12 (106.8%)	74.75
3rd Plan 1961-65	10,200 (96.1%)	2,422 (110.6%)	651.72 (121.5%)	
4th Plan 1966-70	20,000	5,100	1443.92 (—7.98%)	
5th Plan 1971-75	N.A.	N.A.	1328.81	

2.3.2 It can be seen from Table IX that whilst both Plan outlay, and the Investment in Industry, show a definite rise from one Plan period to the next, the percentage rise, from one Plan Period to another, has not been steady. In both cases, the percentage increase between the Second and Third Plan Periods, is lower than in the other periods.

In Table X is shown the Investment in Industry, the Additional Machine Tools Installed and the percentage of Machine Tools Installed to the Investment in Industry during the Plan Periods.

TABLE X

Estimated Demand Correlated to Investment in Industry

(Rs. in Crores)

	Investment in Industry	Additional Machine Tools	% Machine Tools to Investment in Industry
First Plan	306	19.58	6.40
Second Plan	1376	74.75	5.43
Third Plan	2422	153·80 (Estimated)	6.35 (Estimated)
Fourth Plan	5100	340.00 (Estimated)	6.67 (Estimated)

From Table X it is seen that the percentage of Machine Tools Installed to Investment in Industry shows a drop from 6.4% to 5.4%. This drop could be explained by the drop in ratio of the Additional Capacity of MMTUI to the Investment in Industry in the Second Plan as compared to the First Plan Period *see* Table XI column (3). It would be reasonable to expect that this percentage would rise in the Third and Fourth Plan Period in approximately the same relation as the rise in the ratio of Additional Capacity of MMTUI to Investment in Industry.

On this basis the percentage ratio of Machine Tools to Investment in Industry is likely to rise to 6.35% in the Third Plan and 6.67% in the Fourth Plan, and the estimated demand for Machine Tools will be Rs. 153.80 crores for the Third Plan and Rs. 340 crores for the Fourth Plan.

2.4. *Estimate of Value of demand as correlated to Targets of Capacity of Major Machine Tool Using Industries (MMTUI)*

The Perspective Planning Division of the Planning Commission in its paper on the "Estimate of capacity, production, value of output and value added, in organised industries India 1960-1961—1975-1976" Table B. 3 of March, 1964, has indicated the production capacity for these periods in respect of 165 Manufacturing and Mining Industries. For correlating the demand of Machine Tools to installed capacity, the Working Group has selected the installed and the planned and proposed capacities of selected Major Machine Tool Using Industries (MMTUI). For figures prior to 1960, the

Working Group selected the equivalent figures from the Planning Commission Publications—"Third Five Year Plan Draft Outline" and "Programme of Industrial Development". The list of the selected Major Machine Tool Using Industries is shown in Annexure II.

In Table XI an attempt has been made, to evaluate, the relative growth of Investment in Major Machine Tool Using Industries, that is the machine building industry, to the Investment in Industry and the Total Plan Outlay.

2.4.1. *Relative Rate of Growth of Investment in Industry and of Major Machine Tool Using Industries.*

In Table XI is shown the percentage ratio of:

1. Investment in Industry: Plan Outlay
2. Additional Capacity of MMTUI: Plan Outlay
3. Additional Capacity of MMTUI: Investment in Industry
4. Additinonal Machine Tools: Additional Capacity of MMTUI

Figures in Brackets show the increase of decrease on the previous year.

TABLE XI

Relative Rate of Growth of Investment in Industry

(Rs. in Crores)

Plan Period	Ratio: Investment in Industry: Plan Outlay		Ratio: Additional capacity MMTUI: Plan Outlay		Ratio: Additional Cap. MMTUI: Investment in Industry		Ratio: Additional Mc. Tools: Investment in Industry		Ratio: Additional Machine Tools: Additional Capacity MMTUI	
	%	%	%	%	%	%	%	%	%	%
	1	1(a)	2	2(a)	3	3(a)	4	4(a)	5	5(a)
1951-55 . .	9.1		2.31		25.38		6.40		25.21	
		(123.36)		(102.16)		(—9.77)		(—15.16)		(—5.92)
1956-60 . .	20.38		4.67		22.90		5.43		23.72	
		(16.49)		(36.83)		(17.51)				
1961-65 . .	23.74		6.39		26.91		6.35			
		(7.41)		(12.98)		(5.20)				
1966-70 . .	25.50		7.22		28.31		6.67			

It is interesting to note from Table XI, that whilst the basic ratio of Investment in Industry to the Total Plan Outlay has increased from 9.1% to 25.50% Table XI column (1), the rate at which this ratio has increased, actually shows a decline from 123.96% to 7.41% Table XI column (1a). This is also reflected in the relative growth of the Ratio of Additional Capacity of MMTUI to the Plan Outlay Table XI, Column (2) and (2a).

The ratio of Additional Capacity MMTUI to Investment in Industry Table XI column (3) however, shows a definite drop, between the First and Second Plan Periods. The probable reason for this could be that even amongst the industries, the stress on the engineering industries was less. The Third and Fourth Plans show a gradual increase in the ratio of additional capacity MMTUI to investment in Industry. This is obvious because machine building industries which are the major Machine Tool users have been given greater emphasis during these Plans. Again, whilst there is a rise in the ratio in Third and the Fourth Plan Periods to 26.9% and to 28.31% there is a decline in the rate of growth of this ratio from 17.51% to 5.20% Table XI column (3a).

Referring to column 5 of Table XI, it will be seen that the ratio of additional Machine Tools to additional capacity MMTUI has dropped from 25.21% during 1951-55 to 23.72% during 1956-60. The main reason for this could be that during the Second Plan Period more productive Machine Tools have been installed. Even taking the average figures for the two Periods, *viz.*, 24.01% for the ratio of additional Machine Tools to additional installed capacity in the MMTUI, for the Third, Fourth and Fifth Plans, the demand figures for the period 1961 to 1975 would be as given in Table XII.

TABLE XII

Estimated Demands as Correlated to Installed Capacity of Major Machine Tool Using Industries

(Rs. in Crores.)

	Additional Installed Capacity of MMTUI	Additional Machine Tools Installed	Ratio: ADDITIONAL Mc. Tools: Additional Installed Cap. in MMTUI
1st Plan 1951-55	77.66	19.58	25.21%
2nd Plan 1956-60	315.12	74·75	23.72%
3rd Plan 1961-65	651.72 (targeted)	156.48 (Est)	24.01% (Est)
4th Plan 1966-70	1443.92 (targeted)	346.68 (Est)	24.01% (Est)
5th Plan 1970-75	1328.31 (targeted)	318.90 (Est)	24.01% (Est)

It is interesting to note from this table, that unless greater stress is laid on increasing the targets of additional capacity of the Major Machine Tool Using Industries, the demand for Machine Tools is likely to show a decline in the 5th Plan period.

2.5. *Estimate of value of Demand based on assessment by Perspective Planning Division.*

The Perspective Planning Division, in their Paper, Manufacturing and Mining Industries, Programme of Development 1960 to 1970, have estimated the total requirements of all Metal Working Machinery, Jigs, Tools and Fixtures at Rs. 657 crores during the fourth plan period. Of this according to them Rs. 117 crores is for jigs, fixtures and other tooling, giving a figure of Rs. 540 crores as the demand for all types of Metal Working Machinery. Taking Group B as being 20% of Group A, Machine Tools requirement (Group A) works out to Rs. 450 crores.

2.6. *Estimate of demand of Machine Tools by numbers correlated to Major Machine Tool Using Industries.*

The number of Machine Tools, the total value and average price of the imported and indigenous Machine Tool for 1956 to 1963, is shown in Table XIII.

TABLE XIII

Import and Indigenous Production—Machine Tools (1957 — 1963)

	Imported			Indigenous			Total Consumption		
	No.	Value Rs./Crores	Average Price/Rs.	No.	Value Rs./Crores	Average Price/Rs.	No.	Value Rs./Crores	Average Price/Rs.
1956	7,352	8.37	12,008	2,943	1.20	4,100	10,295	9.57	9,300
1957	15,339	11.31	7,400	3,015	2.51	8,300	18,354	13.83	7,500
1958	11,953	12.21	10,200	3,888	3.76	9,700	15,841	15.97	10,100
1959	9,072	11.61	13,000	4,021	4.39	10,800	13,143	16.00	12,200
1960	8,225	13.21	16,100	5,332	6.18	11,600	13,557	19.39	14,300
	51,941	56.71	11,000	19,249	18.04	9,400	71,190	74.75	10,500
1961	11,920	17.89	15,000	8,511	7.76	9,100	20,431	25.65	12,600
1962	10,706	18.95	17,700	10,293	10.88	10,600	20,999	29.83	14,200
1963	10,399	31.51	30,300	11,058	15.44	14,000	21,457	46.95	21,900
	33,025	68.35	21,000	29,862	34.08	11,400	62,887	102.43	16,300

To estimate the demand for Machine Tools by numbers for 1966—1970 it will first be necessary, to revise the estimate of demand for 1961—1965.

From Table XIII it can be seen that the consumption of imported Machine Tools showed a steady decline from 1957 to 1960, rose in 1961, and since then has steadily declined. The average price of the imported machine tools has followed a reverse pattern, steadily increasing from 1957—1960, a drop in 1961 and a very steep rise in 1963. Without adequate statistics of imports it is not possible to explain the reason for this steep increase in price.

The consumption of indigenous Machine Tools, has on the other hand shown a steady rise. The average price of the machine, showed a drop in 1961, but has since then steadily risen.

2.6.0.1. *Past consumption of Machine Tools.*—The increase in the total number of Machine Tools consumed in the past five years, and the increase in the average price of the machine tools is shown in Table XIV:

TABLE XIV

Increase in number and average price of Machine Tools Consumed

	Number Consumed	Total Value	Annual Increase in Numbers		Average price	Difference in average price	
	Rs.	Crores	No.	%	Rs.	Rs.	%
1959	13,143	16.00			12,200		
			414	3.15		+2,100	+17.2
1960	13.557	19.39			14,300		
			6,874	50.70		−1,700	—11.89
1961	20,431	25.65			12,600		
			568	2.78		+1,600	+12.70
1962	20,999	29.83			14,200		
			458	2.18		+7,700	+54.0
1963	21,457	46.95			21,900		

As can be seen from Table XIV whilst there has been an abnormal increase of 50.7%, in the number of Machine Tools consumed between 1960 and 1961, the increase in consumption is, otherwise, on an average, less than 3%. The probable reason for the sudden rise of 50.7% between 1960 and 1961 has been dealt in para 2.6.1. Assuming that the abnormal rise of 50.7% was actually spread over the five year period the average increase would still be about 15%.

2.6.1. *Estimate of demand, by numbers of Machine Tools —Revised estimate for* 1961—1965.

Considering the various conditions at present existing, such as the shortage of foreign exchange and a general levelling off of industrial expansion, an increase of 5% per year, in the consumption of Machine Tools, in the last two years of the Plan, could be considered reasonable.

As regards the price of Machine Tools there was a drop in the average price between 1960 and 1961 and there was a steep rise between 1962 and 1963. The drop in price during 1961 is attributed to the import of a large number of U.S. surplus Machine Tools. These were part of the U.S. Aid and the price at which they were obtained bore no relation to the actual cost of the machines. Thus a large number of Machine Tools were imported at little cost and hence the average price dropped. The increase in average price between 1962 and 1963 is mainly due to the production of more sophisticated types of Machine Tools in the country and also due to import of heavier types of Machine Tools for major machine building projects. It is felt that the average price of Machine Tools would show an increasing trend with the manufacturers going in for better class of machine tools giving increased production and this may be of the order of 10% every year.

In working out the average price of Machine Tools for the period 1961 to 1965, two methods have been adopted:—

(a) Taking 1963 as normal and basing future price estimates at 10% increase per year due to better type of Machine Tools being produced.

(b) Treating 1963 as abnormal and hence basing future price estimates on 1962 price as base and allowing for a similar increase of 10% per annum.

Table XV gives the number of Machine Tools installed in the period 1961 to 1965 and the estimated prices for 1964 and 1965. The total value for Machine Tools installed is also given in the same Table.

TABLE XV

Estimated Consumption of Machine Tools

Year	Number	Average price with 1963 as base (Rs.)	Total value 1963 base (Rs. Crores)	Average price with 1962 as base (Rs.)	Total value 1962 base (Rs. Crores)
1961	20,431	12,600	25.65	12,600	25·65
1962	20,999	14,200	29.83	14,200	29.83
1963	21,457	21,900	46·95	15,000	46.95
Est. Increase	5%		10%		
1964	22,513	24,100	54.23	17,200	38.72
1965	23,600	26,500	62.67	18,900	44.60
	109,000	20,100	219·33	17,000	185.75

2.6.2. *Estimate of demand by numbers of Machine Tools for* 1966-1970

2.6.2.1. Table XVI shows the Installed and Targeted capacity of Major Machine Tool Using Industries, and the Machine Tools installed and estimated for the Five Year Plan Periods.

TABLE XVI

Increase in Installed Capacity and Machine Tools Installed

(Figures in brackets are estimated)

Plan Period	Year	Major Machine Tool Using Industries		Machine Tools Installed in Five Year Period			No. of Machine Tools Installed for each crore increase in installed capacity	Productivity of M/c Tools installed: Per Machine Tool
		Installed capacity	Increase in capacity in Five Year Period	No.	Average price	Value	Number 3/2	2/3
		1	2	3	4	5	6	7
		Rs. crores	Rs. crores		Rs.	Rs. crores		Rs.
	1950/51	32.87						
1st Plan			77.66	19,527	10,000	19.58	251	39,800
	1955/56	110.53						
2nd Plan			315.12	71,190	10,500	74.75	225	44,300
	1960/61	425.65						
3rd Plan			(651.72)	(109,000)	(17,000)	(185.75)	(167)	(59,800)
	1965/66	(1077.37)						
4th Plan			(1443.92)					
	1970/71	(2521.89)						
5th Plan			(1328.21)					
	1975/76	(3850.10)						

2.6.2.2. *Productivity of Machine Tools* 1951—1975.

The percentage increase in productivity of Machine Tools over the Plan Periods is shown in Table XVII.

TABLE XVII

Productivity of Machine Tools

(Figures in brackets are estimated)

	Increase in Installed Capacity during Plan Period in MMTUI		Productivity of Machine Tools				Machine Tools Installed and Estimated		Ratio
			No. of Machine Tools for each Crore increase in Installed Capacity		Output per Machine Tool Installed		Installed during Period Nos.	Total Value Rs. Crores	Value of increase in Installed Cap. to value of M/c Tools Inst.
	Rs. Crores	% Increase	Nos. 4/1	% Increase	Rs. 1/4	% Increase			
	1	1a	2	2a	3	3a	4	4a	5
1st Plan 1951-55	77.66	305.8%	251	10.35%	39,800	11.30%	19,257	19.58 74.75	3.96 : 1 4.21 : 1
2nd Plan 1956-60	315.12	(106.8%)	225	(25.77%)	44,300	(34.98%)	71,190	(185.75)	(3·5 : 1)
3rd Plan 1961-65	651.72	(121.5%)	(167)	(28.14%)	(59,800)	(35.0%)	(109,000)		
4th Plan 1966-70	1443.92	(—7.9%)	(120)	(30.00%)	(83,500)	(35.0%)	(173,000)		
5th Plan 1971-73	1328.21		(85)		(1,17,600)		(113,000)		

It will be seen from column 3 of Table XVII that the productivity per Machine Tool increased from Rs. 44,300 during the Second Plan period to Rs. 59,800 during the Third Plan period, that is an increase of 34.98% over a period of 5 years. It is felt that the same trend would continue during the Fourth Plan period also. On this basis, the estimated output for each Machine Tool during the Fourth Plan will be approximately Rs. 83,500. In other words, the number of Machine Tools required for increasing capacity by Rs. one crore will be 120 during the Fourth Plan period. If the same trend is projected for the Fifth Plan period the number of Machine Tools required for increasing capacity by Rs. one crore will be 85. On this basis the requirements of Machine Tools during the Fourth and Fifth Plans are given in table XVIII.

TABLE XVIII

Estimated Demand for Machine Tools

(Fourth and Fifth Year Plans)

		No. of Machine Tools per Rs. One Crore Increase in Installed Capacity MMTUI	Estimated Demand of Number of Machine Tools
3rd Plan	1961-1965	167	109,000
4th Plan	1966-1970	120	173,000
5th Plan	1971-1975	85	113,000

It is seen from these figures that as the productivity increases, the number of Machine Tools required, to achieve a given increase in production will decrease. In the Fourth Plan Period, in spite of the increase in productivity, the relative increase in Installed Capacity will call for 1,73,000 additional Machine Tools, but in the Fifth Plan, because of the relatively smaller increase in Installed Capacity and the increase in productivity, the likely demand for Machine Tools will appreciably decline.

It is very essential that this factor be carefully considered in determining the capacity for the 4th Plan.

2.6.3. *Value of Machine Tools based on Estimated Demand by number of Machine Tools.*

Having arrived at the estimated demand of the number of Machine Tools required for the Fourth and Fifth Plan periods, it is now possible to estimate the value of this demand.

2.6.3.1. *Average price of Machine Tools during the Fourth and Fifth Plans.*—It has been stated in Table XV that the estimated average price of Machine Tools in 1965, at the end of the Third Plan period is Rs. 18,900. It is considered that due to the rapid technological changes and the use of more sophisticated and more productive Machine Tools in the rapidly expanding industrial sector, the average price of new Machine Tools installed would continue to show a rising trend. This, on the basis of the data now available, could be of the order of 10% per year. The average price for these years has, therefore, been worked out below to arrive at the average price of the Machine Tool over the entire Plan Periods.

TABLE XIX

Average Price of the Machine Tools during the Fourth and Fifth Plan Periods

Year	Average price 1966-70 (Fourth Plan)	Year	Average price 1971-1975 (Fifth Plan)
1966	20,790	1971	33,480
1967	22,870	1972	36,830
1968	25,160	1973	40,510
1969	27,670	1974	44,560
1970	30,440	1975	49,020
Average price 1966—1970:	25,970		

2.6.3.2. *Value of Machine Tools.*—Total value of Machine Tools required during the Fourth and Fifth Plan Periods will be seen in Table XX. These are based on the estimated average price of Machine Tools for the entire Plan Period as shown in Table XIX.

TABLE XX

Value of Estimated demand for Machine Tools

Plan Period	No. of Machine Tools	Value (Rs. Crores)
1966-1970 (Fourth Plan)	173,000	449
1971-1975 (Fifth Plan)	113,000	468

2.7. In Table XXI are summarised the various figures of estimated demand for Machine Tools for the Third, Fourth and Fifth Five Year Plan Periods.

TABLE XXI

Comparative Statement of Estimates of Demand

Ref.	Table		Page	1961-65	1966-70 Rs. Crores	1971-75
2.1	III	Projection of Past Demand.	7			
		8 Year Period		214.01	604.89	
		5 Year Period		223.65	750.41	
2.2	VII	Actual Consumption	13			
2.21	VII	With 1963 Abnormal	13		371.50	
2.22	VIII	With 1963 Normal	14		866.13	
2·3	X	Correlated to Investment in Industry.	17	153·80	340.00	
2.4	XII	Correlated to Capacity of MMTUI by value.	21	156.48	346.68	318.90
2.5		As estimated by Perspective Planning Division.			450.00	
2.6		Correlated to Capacity of MMTUI by Numbers.				
	XX	Based on average price during Plan Periods.	31	185·75	449.00	468·00

It can be seen from Table XXI that estimates of demand arrived at by correlation of value of Machine Tools to the various indicative factors, give widely varying figures. The reasons for this is that each of these methods has built-in limitations, that make correct evaluation difficult.

Projection of Past Demand 2.1.—Estimates based on Projection of Past Demand allows for, to an extent, the future increase in price.

The limitations, however are, that it presumes, the same rate in increase, in the average price and productivity of the Machine Tool, and the same average rate of growth in Industry, as in the past. This necessarily is not so, and to that extent the estimate would be incorrect.

Estimate based on Actual Consumption on Short Term Basis 2.2.—Estimates on this basis can, as seen, be widely thrown out by an abnormal year. Lack of adequate statistics, specially details of Machine Tools imported, make it difficult to analyse the reasons for abnormal fluctuation; and to determine the correction factor which would enable a more rational evaluation possible.

Estimate by value Machine Tools correlated to Investment in Industry 2.3.—This method directly relates the value of Machine Tools required to the increase in Capital Investment in Industry and should give a factual estimate of demand The limitations however, are that future projection is based on the assumption that the rate of growth of the Machine Tool Using Industries is at the same rate as the increase in Capital Investment. Another limitation is that value of the demand as determined is on the existing price basis, and also does not allow for any future increase in productivity.

Estimate by value of Machine Tool correlated to Major Machine Tool Using Industry 2.4.—This method has the advantage of being directly related to a Machine Tool Using Industry, and to that extent is more reliable than the other methods of estimation. The limitations with this method, are as in the previous case, that the value of demand as determined is on existing price basis, and assumes the same rare of productivity. The correcting factor for increased productivity is not easy to determine or apply.

Estimate by number of Machine Tools correlated to Major Machine Tool Using Industry 2.6.—This method has the advantage that is directly relates the number of Machine Tools to the installed capacity in the major user used industries. The additional advantage is that it allows for the determination and application of the correcting factor for future increase in productivity.

Having considered the various indeterminate factors that enter any estimation of Machine Tool requirements by value, the Working Group strongly recommends, that estimation by value alone, by whatever method, does not and cannot give a factual evaluation of the demand for Machine Tools on which any future planning is possible.

Within the limitations of the correctness of the import statistics, the evaluation by number does provide a more correct and practical estimation of the demand, on the basis of which, planning of the production of the future expansions could be made with some reasonable degree of accuracy.

2.8. *Capacity for absorption and effective utilisation of Machine Tools by User Industries.*

On the basis of correlation of numbers of Machine Tools to be installed to capacity in Major Machine Tool Using Industries, the Machine Tools required in the Three Plan period works out at:—

Third Plan	...	...	109,000
Fourth Plan	...	...	173,000
Fifth Plan	...	...	113,000

The Additional number of Machine Tools estimated to be installed in the Fourth Plan period is 173,000. This would mean that on an average 34,000 Machine Tools per year would have to be absorbed by the User Industries in the Fourth Plan period, as against 21,000 Machine Tools per year consumed in the Third Plan period. It would be of interest to determine whether the User Industries would have the capacity to absorb and effectively utilise these additional number of Machine Tools.

2.8.1. *Factors that determine capacity for absorption by User Industries.*

The demand and consumption of Machine Tools would mainly be dependent on the ability and capacity of the User Industries to fulfil the targets envisaged for these Industries during the Fourth Five Year Plan.

The major factors which would determine fulfilment of the targets laid down for the User Industries are: —

1. Whether the targets laid down for the User Industries are realistic and capable of fulfilment.
2. Availability of Finances.
3. Availability of Foreign Exchange, as and when required from suitable sources.
4. Availability of Raw Materials as per planned schedules.
5. Availability of Personnel.
6. Availability of land, power supply, water supply, railway, building, materials etc., in accordance with the programme.

The Working Group has considered that, the examination of the targets of expansion and the other conditions for the fulfilment of the targets for the User Industries, is beyond its scope of reference, and accepts the figures as given by the Planning Commission as capable of fulfilment.

Should these targets of expansion for any reason not be fulfilled the demand and consumption of Machine Tools will to that extent be affected.

2.8.2. *Past trends of Consumption*

The number of Machine Tools consumed between 1956 and 1963 and the equivalent consumption figures are shown in Table XXII.

TABLE XXII

Equivalent Consumption of Machine Tools 1956--1963

	Actual Consumption	Equivalent Consumption 13.5% Annual increase
1956	10,295	10,300
1957	18,354	11,700
1958	15,841	13,300
1959	13,143	15,100
1960	13,557	17,100
1961	20,431	19,400
1962	20,939	22,100
1963	21,457	25,100
TOTAL 1956-63	134,077	134,100

The equivalent figures indicate that on an average the annual increase in consumption is approximately *13.5%*.

Though in 1957 and in 1961 the consumption has increased by nearly 80% and 50%, in the past three years the increase has barely been 2.5%.

2.8.3. *Estimation of annual increase to achieve* 173,000 *Machine Tools in period* 1966—70.

It will be seen from Table XVII that the demand for the total number of Machine Tools during the Fourth Plan period will be 173,000 Nos. To achieve this figure for the Fourth Plan period with 1965 base at 23,600 Nos. the annual increase works out at 13% Year-wise estimate along with the corresponding average prices and values are given in Table XXIII.

TABLE XXIII

Yearwise estimate for 173,000 Machine Tools for 1966-70

Average Annual increase 13%

Year	Nos.	Average price Rs.	Value in Rs. Crores
1966	26,700	20,790	55.00
1967	30,200	22,870	70.00
1968	34,100	25,160	86.00
1969	38,500	27,670	106.00
1970	43,500	30,440	132.00
TOTAL:	173,000		449.00

2.9.0. *Working Group Estimate of Demand for Machine Tools, Fourth Five Year Plan,* 1966-1970.

Having considered the various factors likely to affect the targets of capacity of the Machine Tool Using Industries, the Working Group feels that in many cases the period for achieving the targets of capacity is likely to spill over into the Fifth Plan. If, however, the targets are achieved then the User Industries should be in a position to absorb the additional Machine Tools at an annual increasing rate of 13% which would give an estimated figure of demand of 173,000 Machine Tools for the period 1966—1970.

The figure of demand being based on correlation of capacity of user industries, takes into account normal replacement of machine tools, and also Machine Tools requirements for Technical Education. It does not take into account the Machine Tools normally made and used by some of the Small Scale Industries. The demand for the low priced Machine Tools mainly manufactured by the Small Scale Sector will remain for sometime to come and will be met as heretofore.

The Working Group does not have sufficient information or data, to assess the demand for these low priced Machine Tools manufactured by the Small Scale Sector.

2.9.1. *Value of Demand—Machine Tools Group A*

On the basis of the above conclusions the Working Group has estimated the value of Machine Tools requirements for the period 1966—1970 at Rs. 449 crores corresponding to 173,000 Nos.

2.9.2. *Value of Demand—Metal Working Machinery Group B*

In defining, the term of Machine Tools a distinction has been drawn between Machine Tools (covered by Group A) and other Metal Working Machinery (covered by Group B). All the foregoing discussions have been confined to estimating the demand for Machine Tools as such but from a development point of view it is considered essential to determine not only the demand for Metal Working Machinery but also the targets of production as these are complementary items to the Machine Tools in any engineering factory. According to the latest trends, it is seen that the proportion of Metal Working Machinery to Machine Tools is of the ratio of 1:4. On this basis the demand for Metal Working Machinery over the Fourth Five Year Plan period will be Rs. 112 crores based on a demand of Rs. 449 crores for Machine Tools. It will be difficult to determine the quantity corresponding to this value.

3. *TO MAKE AN ANALYSIS OF THE DEMAND FOR MACHINE TOOLS BY GROUPS, TYPES & SIZES AND TO WORK OUT IN DETAIL THE DEMAND FOR MACHINE TOOLS BY GROUPS, TYPES & SIZES FOR EACH OF THE YEARS OF THE FOURTH PLAN*

3.1. *To analyse the Demand for Machine Tools.*

A detailed analysis of the demand for Machine Tools by individual Machine Tool Using Industries, other Machine

Tool Users such as Technical Institutions, and for replacement, though desirable, has not been possible. A broad analysis correlating the production capacity of the Machine Tool Using Industries to Machine Tools installed has been made. As mentioned earlier, since the Machine Tools installed, include those for replacement and for other users, the estimates based on this correlation give a fairly accurate figure of demand.

The total number of Machine Tools required for the periods 1964-1965 and 1966—1970 has been worked out at:

	Estimated Demand Numbers
1964-1965	46,113
1966-1970	173,000
	219,113
TOTAL (Rounded off) ..	219,000

The total number of Machine Tools, which it is estimated should be installed by 1970 would then be:

Machine Tools Installed up to end 1963	203,000
Machine Tools estimated to be installed in Seven Years 1964—1970	219,000
Total Machine Tools estimated to be installed by end 1970	422,000

3.1.1. *Pattern of Demand*

To analyse the demand for Machine Tools the Working Group first determined the Pattern of Machine Tools of the 422,000 Machine Tools estimated to be installed by 1970.

In arriving at the recommended Pattern for Machine Tools in 1970, the Working Group has taken into consideration, the Pattern of Machine Tools installed in 1963, the Pattern and Change of Pattern over a period of years in other industrialised countries, the likely demand of the User Industries, and the present known capacity of indigenous manufacturers.

The recommended Pattern may not be ideal Pattern, which could perhaps be possible if Imported Machine Tools were freely available. The Working Group, therefore, considered that Pattern recommended should be a practical one, which could be achieved within the limitations of the conditions likely to prevail.

The number and pattern of Machine Tools, by groups as installed in 1963, the recommended pattern for 1970, the number of Machine Tools by Groups based on this pattern, and the number of additional Machine Tools required in this period 1964 to 1970 are shown in Table XXIV.

The Working Group would like to stress that the Pattern will have to be reviewed from time to time, and modified to meet the anticipated changes in the demand of the User Industries as they develop and as the capacity of indigenous manufacture grows to meet the requiring change of Pattern.

TABLE XXIV

Recommended Pattern of Machine Tools and Additional Machine Tools Required 1964—1970

D. O. (T) Code No.	Machine Tools (Group A)	Installed 1963		Estimated Demant of Total Installed by 1970		Additional Machine Tools Required 7 year Period 1964—1970
		Nos.	Pattern %	Pattern %	Nos.	
1	2	3	4	5	6	7
01	Automatics	1,050	.56	1.4	5,600	4,560
02	Boring	4,120	2.19	2.6	10,400	6,280
03	Broaching	150	.08	.15	600	450
04	Drilling	26,000	13.84	16.0	64,000	38,000
05	Gear Cutting	880	.47	.75	3,000	2,120
06	Grinding	33,600	17.87	17.0	68,000	34,400
08	Lapping & Honing	880	.46	.6	2,400	1,520
09	Cap. & Turrets	6,260	3.33	5.0	20,000	13,740
10	Lathes	42,000	22.33	17.6	70,400	28,400
11	Milling	9,840	5.24	7.9	31,600	21,740
12	Planing	1,600	.85	.8	3,200	1,600
13	Presses	18,850	10.04	10.1	40,400	21,550
14	Sawing	5,470	2.90	3.4	13,600	8,130

TABLE XXIV *contd.*

1	2	3	4	5	6	7
15	Shaping	5,090	2.70	2.1	8,400	3,310
16/17	Shearing & Sh. Metl.	17,300	9.21	6.5	26,000	8,700
18	Slotting	1,500	.81	.7	2,800	1,300
19	Screwing	1,700	.92	.7	2,800	1,100
20	Threading	1,180	.62	.8	3,200	2,020
22						
—1500	Hammers	2,070	1.10	1.1	4,400	2,330
—2200	Tapping	1,060	.56	.6	2,400	1,340
—2300	Bending O. T. Rolls	2,540	1.35	1.3	5,200	2,660
—2600	Polishing	4,840	2.57	2.9	11,600	6,760
		188,000	100.00	100.00	400,000	212,000
Not elsewhere specified		15,000			22,000	7,000
	TOTAL	203,000			422,000	219,000

4. *TO RECOMMEND THE CAPACITY & PRODUCTION TARGETS FOR 1970-71 FOR MACHINE TOOLS BY GROUPS, TYPES AND SIZES TO THE EXTENT INDIGENOUS MANUFACTURE IS CONSIDERED FEASIBLE AND DESIRABLE.*

The estimated demand for the period 1965—70 is 173,000 Machine Tools. In the absence of the statistics required, to analyse up the demand, into types and sizes the Working Group is hesitant to make definite recommendations on the Targets for Capacity or Production of the individual types and sizes required during the period. In principle the Working Group recommends, that the Targets for 1970 should be—

Target for Capacity 85%

Target for Production 75%

The Working Group considers that by numbers, the overall Target of 85% for Capacity and 75% by Production is feasible and desirable. This will be a significant jump towards the goal of self-sufficiency. At present indigenous production covers only 33% of the overall requirement.

4.1. *Targets of Capacity and Production* 1970-1971.

The demand by numbers of Machine Tools, by groups for the period 1964—1970 is shown in Table XXIV. The estimated demand by groups, for each of the years has not been possible.

The estimated demand by total numbers and value for each of the years of the Fourth Plan has been shown in Table XXIII.

The demand for 1970 for Machine Tools required in the country is 43,500. It is unlikely that more than 75% of these can be met by indigenous manufacture. The requirements of indigenous Machine Tools for internal consumption would then be 32,600 numbers. The value of these at the projected 1970 level will be Rs. 99 crores.

4.2. *Target for Export.*

Taking into consideration the progress made in the production of Machine Tools of modern design and also the anticipated developments, the Working Group would recommend an export target of approximately Rs. 4.0 crores annually by 1970. This will be in addition to the production of Rs. 99 crores indicated above for indigenous consumption.

4.3. *Value of Targeted Production and Capacity 1970 for Machine Tools Group B.*

As mentioned earlier the consumption of Machine Tools Group B is approximately 25% of Group A. The demand for Group B, would then be approximately Rs. 33 crores. As the present production is hardly 15% of the demand, the maximum production target feasible would be 50%.

On this basis the target of production for Machine Tools Group B by 1970 will be Rs. 16.0 crores. To achieve this the capacity to be planned will be Rs. 18 crores.

The production at the end of 1965 is likely to be Rs. 1.5 crores which would then have to be raised to Rs. 16.0 crores by 1970.

4.4. *Targets of Capacity and Production*

On the basis of the above conclusions the targets of Capacity and Production for 1970 for Machine Tools and Metal Working Machinery will be as in Table XXV.

TABLE XXV

Targets 1970

Items	Capacity		Production	
	No.	Value Rs. crores	No.	Value Rs. crores
(1) Machine Tools for Indigenous Consumption.	37,000	113.00	32,600	99.00
(2) Machine Tools for Export.			1,500	4.00
(3) Metal Working Machinery.		18.00		16.00
TOTAL		131.00		119.00

5. *TO MAKE AN ASSESSMENT OF THE PRODUCTION CAPACITY OF EXISTING AND PROJECTED MANUFACTURING FACILITIES FOR MACHINE TOOLS AND TO WORK OUT GAPS BY GROUPS, TYPES AND SIZES*

In Table XXIV is shown the projected production programme of Machine Tools as indicated by the 44 firms in their replies to the Questionnaire. The Table also gives their estimates of capital equipment required and the inescapable imports for maintenance. The Returns as submitted show that for the Fourth Plan Period they would require imports of the order of Rs. 35 crores for capital goods and about Rs. 77 crores for raw material, components etc. They envisage that this will result in a total production of Rs. 405 crores.

A preliminary scrutiny of the answers received reveals the fact that in many cases the projections are over-ambitious. They would require close examination of the Returns, discussions with the individual firms and perhaps 'on the spot' study. Their capabilities for expansion both with regard to financial ability, availability of personnel, training facilities etc. will have to be taken into account.

5.2. *To assess Categorywise Gaps in Capacity.*

In addition to the existing firms in production who have replied to the Questionnaire, a number of new units have also been licensed by Government for the manufacture of various types of machine tools. These are in various stages of implementation. Judging from the past experience, it is not unlikely that quite a few schemes may not fructify. Even allowing for these likely failures, it is felt that the output from these units licensed would be quite substantial. As in the case of the existing units, it will be necessary to have detailed discussions with these licensed units to exactly determine the extent to which they can be relied upon to fulfil the various manufacturing programmes licensed to them. Because of this limitation it is not possible for the Working Group to be specific in indicating the likely gaps and capacity for the various Machine Tool items that will have to be filled in during the Fourth Plan. All that is possible at this stage is to give a broad indication about the types of Machine Tools for which near self-sufficiency has already reached and for which a lower order of priority may be given for further expansion in relation to certain types of Machine Tools for which there is immediate need for creating additional capacity.

TABLE XXVI

Projected Production Programme of Number of Machine Tools
44 Manufactures 1964/65—1970/71

D. O. (T) Code No.	GROUP A	1964/65	1965/66	1966/67	1967/68	1968/69	1969/70	1970/71	TOTAL 5 YEARS 1966/67–1970/71	TOTAL 7 YEARS 1964/65–1970/71
01	Automatics	151	258	400	633	742	806	861	3,442	3,851
02	Boring	41	58	85	100	165	236	258	844	943
03	Broaching		..	..	..	5	10	20	35	35
04	Drilling	3,182	4,276	5,232	6,560	9,762	13,495	16,663	51,683	59,141
05	Gear Cutting	9	32	39	72	117	146	196	570	611
06	Grinding	1,249	1,860	2,415	2,905	3,305	3,784	4,486	16,895	20,004
08	Lapping & Honing						10	20	30	30
09	Capstan & Turrets	318	624	956	1,273	1,641	1,862	2,092	7,824	8,766
10	Lathes	5,597	6,309	7,894	8,558	9,604	10,693	10,801	47,550	59,456
11	Milling	1,170	1,844	2,310	2,724	3,154	3,639	3,888	15,715	18,729
12	Planing	154	183	206	272	311	321	349	1,459	1,796
13	Presses	826	1,027	1,254	1,657	1,870	2,242	2,507	9,530	11,383
14	Sawing	593	763	797	860	925	988	1,071	4,641	5,315
15	Shaping	831	1,154	1,363	1,678	1,903	2,160	2,366	9,470	11,455

16/17	Shearing & Sheet Metal	404	505	646	762	871	1,016	1,111	4,406	5.315
18	Slotting	30	36	40	40	48	54	60	242	308
19	Screwing	20	30	40	60	80	100	120	400	450
20	Threading	..	..	..	..	..	..	..	..	..
2215	Hammers	39	50	70	90	110	120	120	510	599
22/22	Tapping	..	..	..	..	..	..	..	..	..
22/23	Bending other than Rolls	12	12	16	16	16	16	16	80	104
22/26	Polishing	55	90	111	130	150	190	225	806	951
	Special Purpose Machines	29	34	20	20	30	40	50	160	223
	TOTAL NUMBER OF MC. TOOLS	14,170	19,145	23,894	28,410	34,809	41,929	47,250	176,292	210,147
	Total value of Mc. Tools and Accessories Rs. Crores	24.88	37.71	51.73	66.55	82.63	98.01	113.01	411.93	474.52
	Imported Capital Requirements Rs. Crores	9.68	5.79	6.34	7.15	8.56	6.36	6.38	34.80	50.26
	Imported Raw Materials and Components Rs.Crores	5.90	8.51	11.88	12.78	16.30	17.18	18.55	76.69	91.10
	Average Price of Machine Tool	16,900	19,700	21,650	23,400	23,800	23,400	23,900	23.400	22,600

5.2.1. *Price Range Requirement*

The Working Group feels that, there is somewhat less appreciation of the requirements of the User Industry for Machine Tools in different price ranges. The general impression prevailing in this country is that a low price machine, is necessarily, poor in quality and poor in performance. This impression has been created by the availability of a large number of low priced machines which are poor in quality. Leaving the user no chance but to buy a high priced machine, with a production capacity and accuracy of performance, beyond the needs of his requirements, entails his paying a higher price for his means of production or in the alternative to buy a machine poor in quality.

5.2.2. *Gaps in Capacity*

As already stated it would not be possible to make out the Groups of Machine Tools for which alone additional capacity will have to be created in future. Even within the broad category of general purpose Machine Tools for which near self-sufficiency is said to be achieved, there will be gaps with regard to price range, size and technical features not obtainable in the machines already in production. It will be the duty of D.G.T.D. to examine new schemes with the specific object of meeting the above requirements. Apart from this the Working Group would recommend giving a higher *inter se* priority for the following items:

Boring Machines
Broaching Machines
Gear Cutting
Grinding
Lapping and Honing
Presses
Slotting
Screwing and Threading
Hammers
Bending Other than Rolls
Polishing

The Working Group would reiterate at the risk of repetition that its recommendations are not meant to exclude creation of additional capacity for Machine Tools other than the above. Each case for creation of additional capacity will be considered on merits by D.G.T.D. as heretofore.

6. *TO INVESTIGATE THE BEST MANNER IN WHICH THE GAPS CAN BE COVERED TO THE EXTENT FEASIBLE AND DESIRABLE BY THE END OF THE FOURTH PLAN*

AND

TO MAKE SPECIFIC PROPOSALS TO THIS END BY WAY OF EXPANSION OR NEW PROJECTS

From the limited data available, the Working Group is of the opinion that, what appears to be gaps in the production capacity, are Machine Tools required in relatively small quantities in widely divergent types and sizes and in the high price range. Some examples of these are, multispindle automatics, continuous type broaching machines, die sinking and duplicating machines, jig boring machines, large diameter gear cutting machines, gear grinding machines, lapping machines, presses of 500 to 1000 tons and over. These are only a few of the machines which are not as yet planned for manufacture.

There are other machines which though not planned, for manufacture, are within the scope of existing manufacturers. A few of these are multispindle automatics auto turrets, wheel and axle lathes facing and centering lathes, second operation lathes, lapping and honing machines most sizes of presses threading machines and special polishing machines. Apart from this, as mentioned earlier, there are in many of the groups, gaps in types, sizes and price-range that will need to be covered.

The Working Group recommends that a detailed investigation be undertaken for determining the pattern of demand by types, size and price-range. This study will then help in determining the gaps that have to be catered for. The Working Group is aware that this is a colossal task but in view of the importance of the industry, such as study is considered essential.

Whilst the Working Group finds it difficult to make specific proposals on how the gaps should be covered they do consider that:

(i) It appears that most general purpose Machine Tools in the light and medium range are covered by the programme of manufacture of the existing units. Further, it is understood, additional licences have been given for the manufacture of Machine Tools in this range. Before planning for further large scale expansion of manufacture in these groups and types,

a careful investigation should be carried out whether this additional capacity would be desirable.

(ii) Once specific information is available of the real gaps in manufacturing capacity, then priority should be given to fit in the manufacture of these Machine Tools into existing units, specially these units, who under the changing pattern of demand are likely to have surplus capacity and who have the necessary technical resources.

(iii) Scope appears to exist for additional capacity for the heavy and very heavy Machine Tools. The existing programme for Heavy Machine Tool Building Project is quite extended. If additional capacity can be set up in one or more units in the immediate future with a programme to start with the manufacture of those Machine Tools, as are scheduled for the later part of the manufacturing programme of the Heavy Machine Tool Building Project, it will greatly shorten the period required to cover the over-all range of Machine Tools, and will have the advantage of a certain amount of needed diversification in the types of Machine Tools manufactured. An important advantage will be the saving of foreign exchange, for though the numbers of such heavy Machine Tools are relatively small the average price of each Machine Tool is quite considerable.

(iv) The Working Group very strongly recommends that no rigid policy be set on the development of the Machine Tool Industry. The changing pattern of demand, brought on by modern technological developments, specially in the design of Machine Tools, is so rapid, that a policy that cannot react to these changes with equal speed could seriously affect the growth of this industry.

7. TO MAKE AN ESTIMATE OF THE INVESTMENT AND FOREIGN EXCHANGE ON CAPITAL AND MAINTENANCE ACCOUNT REQUIRED FOR IMPLEMENTING THE PRODUCTION PROGRAMMES RECOMMENDED

7.1. *Total Investment* 1964—1970

The production in 1963 was Rs. 17.0 crores for Machine Tools Group A. This will need to be increased to Rs. 103 crores. Similarly the present production of Rs. 1.5 crores for Group B will need to be increased to Rs. 16 crores.

The total production envisaged will be:—

	(Rupees crores)
Machine Tools Group A	103.00
Machine Tools Group B	16.00
	119.00

For achieving the above production, the additional capacity to be planned will be Rs. 101 crores. Some of the additional capacity will be through substantial expansion of existing units and the balance will be through establishment of new units. On this assumption the total investment for creating an additional capacity of Rs. 101 crores will be Rs. 105 crores.

7.2. *Requirement of Foreign Exchange for Capital Equipment*

The Working Group considers that the requirement of imported capital equipment to achieve an additional capacity of Rs. 101 crores at the end of the Fourth Plan will be Rs. 44 crores.

In the Machine Tool Industry the period for investment to materialise into productive capacity is on an average two years. The Working Group, therefore, strongly recommends that at least 30% of the foreign exchange *i.e.*, Rs. 14 crores approximately be released as advance action during the Third Plan period. The remaining Rs. 30 crores should be released within the first two years of the Fourth Plan period. If the release of foreign exchange is delayed, targets of production will not be achieved.

7.3. *Requirement of Foreign Exchange for Raw Material*

The Working Group considers that the foreign exchange required for Raw Materials and Components will cover the Plan Period average approximately 25% of the Production.

The foreign exchange required for this period 1966—1970 will be Rs. 112.0 crores.

8. *TO MAKE AN ESTIMATE OF POWER FUEL TRANSPORT AND OTHER REQUIREMENTS OF A SIGNIFICANT ORDER*

The requirements of power, transport, and other requirements are not of significant order.

9. *TO MAKE AN ESTIMATE OF RAW MATERIALS COMPONENTS ETC. REQUIRED FOR THE MANUFACTURE OF SUCH EQUIPMENT AND SUGGEST MEASURES FOR INDIGENOUS MANUFACTURE OF SUCH ITEMS*

The more important Raw Materials and Components are listed below. No data is available for making an estimate of their requirements. The general remarks against each item gives the position as regards the indigenous availability.

Raw Materials	Availability	Remarks
Pig Iron	Indigenous	Not available in right grades or in adequate quantities.
Coke	Indigenous	Very high in ash content, difficult for manufacture of good castings.
Alloy Steels	Imported	Standardisation to some extent is necessary so that when manufactured indigenously supply will be facilitated.
Components:		
Ball and Roller Bearings.	Imported some available indigenously.	Requirement of Ball and Roller Bearings for the Machine Tool Industry is of specialised nature all the world over. Bearing manufacturers in foreign countries make special efforts in selecting bearings conforming to high standard of accuracy and mark them as such for supply to Machine Tool manufacturers. It is essential for the indigenous manufacturers of bearings to follow this procedure as the bearings manufactured for general consumption are not accurate enough for the Machine Tool for it to give the accurate performances.
Clutches	Imported	The manufacture of mechanical electric and hydraulic clutches should be encouraged.
Hardware:		
Hollow head Screws Circlips High pressure seals.	Imported	These are imported even now. Manufacturers of these should be encouraged.

1	2	3
Electricals Controls	Imported	Apart from Standard starters most other electrical controls have to be imported. Manufacture of these would need encouragement.
Anciliaries:		
Dividing heads	Imported	All these items need to be Manufactured in the country.
Precision Chucks	Imported	
Pneumatic Chucks	Imported	
Electromagnetic Chucks.	Imported	
Quick change drill Chucks.	Imported	
Tooling:		
For Capstans and Turrets.		The capacity for design and manufacture has to be created.
For Automatics		

10. *TO RECOMMEND MEASURES BY WHICH UTILISATION OF MANUFACTURING CAPACITY AND PROGRAMMES OF PRODUCTION IN THE CONSUMING SECTORS ARE COORDINATED TO THE FULLEST EXTENT*

The Working Group agrees that there should be some machinery to coordinate the requirements of the Machine Tools for the various consuming sectors and the programme for the production of machine tools by the different Machine Tool manufacturers. It is pointed out that one of the objectives of the Development Council set up for the various industries is to have a coordination between the manufacturing industries and the user industries. In the Development Council for Machine Tool Industry, in addition to representatives of major manufacturers, other interests like the major consumers of Machine Tools, the trade, etc., are represented. It should be possible for the Development Council to have a small sub-committee to disseminate information regarding the requirement of Machine Tools by the various user industries to the manufacturers of Machine Tools. The latter will then be in a position to plan their manufacturing programmes to meet the requirements of these industries to the extent possible. It will also be necessary for D.G.T.D., who is directly

concerned with the development of all the industries, to keep a close liaison between the users of Machine Tools and manufacturers of Machine Tools.

11. *TO MAKE SUCH OTHER RECOMMENDATIONS AS MAY BE RELEVANT*

11.1. *Collaboration and Phased Manufacturing Programme*

The present production of Machine Tools mainly covers items which are in great demand and also Machine Tools of comparatively simpler design. The Working Group has recommended that at least 75% of the requirements of Machine Tools should be met indigenously by the end of the Fourth Plan period. This would involve taking up the manufacture of Machine Tools which are not required in large numbers. At the same time production of these calls for high degree of precision during manufacture. Whilst the Working Group agrees with the Government's present policy in insisting on maximising indigenous content, it is felt that where Machine Tools of complicated nature are undertaken, it will be necessary to have a more flexible approach.

Items like multispindle automatics call for considerable degree of precision in manufacture. If high indigenous content is insisted upon even in the early stages, it is feared that commencement of production may be delayed either because of the time taken to install the capital equipment required or on account of the inherent fears on the part of manufacturers in committing themselves to install costly equipment which may be idle for quite some time. In the opinion of the Working Group it will hasten development of indigenous capacity for such machines if a higher import content say 60% is allowed in the initial stages.

It will also be necessary to go in for foreign collaboration for obtaining the technical 'know-how', in respect of various types of Machine Tools which are not yet being manufactured in the country. In general, it is understood Government have been accepting proposals for collaboration based on a royalty of 5% taxable and in exceptional cases have even agreed to a royalty at 7½%. Although this policy has by and large worked out satisfactorily, the Working Group is of the opinion that it may be even necessary to consider favourably payment of higher royalties in exceptional cases if there are sufficient technical reasons. But apart from this in a number of cases the foreign manufacturers are sometimes reluctant to commit

themselves to a taxable royalty as they are not sure about the net income they would receive as it would largely depend upon taxation proposals enacted from time to time. In order to encourage the foreign manufacturers to part with their technical 'know-how' and also allay their fears, regarding the minimum return they can expect, it is recommended that the Government may consider the possibility of assuring a net return *e.g.* 2½% nett on a 5% taxable royalty to the foreign manufacturer, the tax being borne by the Indian manufacturer. This will have the dual advantage inasmuch as the foreign manufacturer is assured of his net return and at the same time Government is not deprived of its legitimate taxes.

11.2. *Collection of Statistics*

A census of Machine Tools was undertaken in 1954, which not only indicated the total number of machine tools installed and their age group, but also indicated the number of machine tools by Groups, types and sizes. The pattern of demand as indicated by this census was used for estimating the pattern of demand in the Third Five Year Plan.

No further census has been taken since 1954, nor is detailed information available of the machine tools installed in the last few years. The figures of imports published by the Department of Commercial Intelligence and Statistics, give in general the imports of machine tools by Groups but do not give any indication of the types and sizes in the Groups. As regards indigenous production, whilst figures of production of the manufactures on the list of the D.G.T.D. are available in detail, figures of other manufactures mainly in the small scale industry are not available.

The Working Group feels that in order to plan a rational development of the industry, it is essential to know the pattern of machine tools installed and the change in pattern that takes place over the years. This information can only be possible if more accurate data is available of the consumption of machine tools from year to year.

For this the Working Group would recommend:

(i) A census of machine tools to be taken for the machine tools installed as in 1964, ten years from the last census. This would give the present pattern of machine tools installed and reflect the change in Pattern in the last ten years.

The census should indicate, the Group, Type, Sub-Type and Size of the machine and also its age. The D.G.T.D. should immediately undertake preparation of a revised code for classification of Metal Working Machinery on the basis of which the census should be taken.

The census should also indicate the pattern of machine tools in major Metal Working Machine Using Industries. The recommended industries are shown below.

The Working Group would also recommend that it would be desirable that the machinery for taking the census should be so set up that a new census would be possible every five years.

(ii) Apart from the census which would be taken every five years it is desirable to know year to year, the consumption of machine tools. As indicated earlier detailed figures of machine tools imported are not available and the Working Group recommends that the procedure recommended by the Engineering Capacity Survey Committee be adopted for the collection of Statistics of Imported and Indigenous Machine Tools.

The detailed procedure for this was elaborated in the report of the Engineering Capacity Survey Committee 1954, (page 138). A copy of the relevant chapter is reproduced—Annexure III. The Working Group feels that had the Government accepted the recommendation contained in the above report and implemented it, the Working Group would have had better data for projecting the requirements of machine tools during the Fourth Plan period. It was also noticed that system of coding of machine tools which was also introduced as a result of the recommendations contained in the above report has been discontinued due to administrative difficulties. The import statistics published by the Director General of Commercial Intelligence Statistics are not sufficiently detailed to indicate the types and sizes of machine tools imported. It is understood from D.G.T.D. that an attempt was made to evolve a common code for use by D.G.T.D. and D.G.C.A. for compiling import statistics. It has however been represented, that due to the fact that D.G.C.A. has to conform to the pattern evolved by UNO, and due to the limitation of existing computer system it is not possible to elaborate the D.G.C.A. Code to meet the full requirements of D.G.T.D. The only alternative left will be to introduce the system of reporting to D.O. (Tools) directly by the various Collectors of Customs at different ports regarding the machine tools imported from time to time, as per the procedure suggested in Annexure III.

Major Machine Tools using Industries for which separate Statistics should be maintained

Foundaries

Forge Shops

Steel Plants (Main Producers)

Metalworking Machine Tools

Engineers Small Tools & Gauges

Industrial Engines

Textile Machinery

Contractors Plant and Quarrying Equipment

Other Machinery

Industrial Plant and Steelwork

Agricultural Machinery

Other Mechanical Engineering

Electrical Machinery

Telegraph and Telephone Apparatus

Domestic Electrical Appliances

Other Electrical Goods

Scientific and Surgical Instruments

Shipbuilding and Marine Engineering

Motor Vehicle Manufacturing

Aircraft Maintenance and Manufacturing

Railway Maintenance

Railways Manufacture Ordinance

Metal Industry n.e.s.

ANNEXURE 1-A

D.O. (Tools) Code No.	*Machine Tools (Group A)*
01	Automatics
02	Boring
03	Broaching
04	Drilling
05	Gear Cutting
06	Gear Grinding
07	Gun
08	Honing and Lapping
09	Capstans & Turrets
10	Lathes
11	Milling Machines
12	Planning Machines
13	Presses
14	Sawing
15	Shaping
16/17	Shearing, Plate & Sheet Metal
18	Slotting
19	Screwing
20	Threading
22.15.60	Hammers
22.18.00	Reeling
22.22.00	Tapping
22.23.00	Bending other than rolls
22.26.00	Polishing
	Machine Tools for Working Metal NES.

ANNEXURE 1-B

D.O. (Tools) Code No.	*Other Metal Working Machines (Group B).*
13.11.00	Press Moulding
22.08.00	Die Casting
22.12.00	Forging Machines
22.18.00	Rivetting Machines
22.24.00	Wire Drawing Machines
22.25.00	Core Making Machines
22.34.00	Moulding Machines
	Metal Working Machinery not elsewhere specified
	Drill Chucks
	Lathe Chucks
	Parts and accessories for machine tools
	Portable Electric Drills
	Portable Electric Grinders
	Portable Electric Tools
	Pneumatic Hammers
	Pneumatic Tools
	Wood Working Machinery

ANNEXURE II

Installed Capacity of Production of Major Machine Tool Using Industries (MMTUI)

Extract from Table B. 3 Estimate of Capacity production Value of Output and Value Added in Organised Industries in India 1960-1961 1975-1976.

Item No. of Table B 3.	Industry
133	Cotton Textile Machinery
136	Cement
135	Sugar
137	Paper
142	Dairy
146	Industrial Boilers
145	Power Boilers
161	Cranes
151	Machine Tools
141	Metalurgical and Other Heavy Machinery Building.
132	Coal Mining Machinery
140	Heavy Plate and Vessal
88	Structural Fabrication
157	Precision Instruments
159	Surgical Instruments and X-ray equipment.
164	Watches clocks & Timepieces
121	Locomotive Steam
122	Diesel Locomotive
123	Electric Locomotive
120	Wagons Rail
119	Coaches Rail
125	Motor car, passenger & jeep

Item No. of Table 3.	Industry
124	Commercial vehicles
127	Automobiles anciliary
126	Motor cycles and Scooters
158	Ball and roller bearings
153	Crawler Tractors
155	Dumpers and scrapers
154	Shovels
152	Road Rollers
149	Power Driven Pumps
148	Diesel Engines
147	Tractors
129	Bicycles
130	Bicycles parts
163	Sewing Machines
130	Ship Building
95a	Electric Transformer upto 33 kva
95b	Electric Transformer above 33 kva
96a	Electric motor below 150 kw
109	Electric fans
98	House Service meters
94a	(Generators) Turbo generators hydro
94b	,, Turbo generators steam
97	Switch gear
108	Refrigerators
106	Air conditioner
107	Water coolers
150	Compressors
138	Printing machines
134	Jute machines
91	Steel furniture
89	Huricane lantern
92	Utensils
93	Metal and primary product others
114	Electrical engineering others
131	Transport equipment others
165	Machinery others

ANNEXURE III

Proposed recommendations for collection of Statistics for the Machine Tool Industry

The Panel considers that it is imperative and very urgent that reliable statistics are obtained of the machine tool requirement of this country, as without this information, it will be impossible to draw up a rationalised programme for an accelerated development of the Machine Tool Industry, on the progress of which depends to a large extent the self-contained progress of the other industries.

As no reliable source of this information exists to-day, it is essential that some procedure should be laid down by the Government to enable this essential information to be collected.

India's requirements of machine tools are to-day being met by—

(i) Imports from abroad.

(ii) Indigenous manufacturers of graded machine tools.

(iii) Manufacturers of ungraded machine tools.

As the value of machine tools manufactured by ungraded manufacturers is comparatively small at present, sufficiently reliable data of requirements could be complied if detailed information can be obtained from the first two sources.

The information, to be of any practical value, must be quite detailed and should give the group, class, type and size of the machine tools.

In order that the information collected can be easily correlated, it is essential that machine tools should be properly classified and coded, and for this one or other of the known classified codes could be utilised.

A number of classified codes of different countries have been considered and it is suggested that the U.K. code Stand and Classification of Machine Tools Part I and II would be the most suited to our requirements and once this code is adopted, all information and data called for should be based on this code.

In order to obtain data of machine tool imported the following procedure is recommended—

(a) all licences will bear against each machine tool its correct code number.

(b) at the time of clearance, the clearing agent will hand over to the customs in duplicate the form 'A' (which will be supplied by the licensing authority) duly filled in, there being a separate return for each Code Number).

(c) the duplicate forms will each month be sent to the authority appointed by the Government to correlate the returns.

(d) the Customs will continue to include the imports in their daily customs returns, with an addition that along with the description, the Code Number should also be mentioned.

The information collected so far will cover those machine tools imported under licence issued by Development Officer (Tools) only and as there are, in addition, machine tools imported through other authorities, for those, we recommend—

2. For those machine tools imported under licences for complete plants issued by G.C.I., the same procedure as that recommended for Development Officer (Tools) could be followed, but we would preferably recommend, that C.C.I. should from the importer a separate list showing all the machine tools to be imported and this list should be sent by the C.C.I. to the Development Officer (Tools), who should issue the licence for these machine tools, sending back the licence to the C.C.I. This procedure will ensure that the correct Code Number has been given. In this case also, the actual importer must submit form 'A' at the time of clearance.

3. For those machine tool orders placed by the Defence Department directly in U.K. or U.S.A. through the Indian Trade Commission, we understand no licences are issued. We are also given to understand that the different Services and sections of the Defence Department directly and independently place their orders abroad and when the items are received in the country, they may or may not be declared itemwise in the Customs returns.

We would, therefore, like to suggest that in the case of the Defence Department—

(a) All orders should bear the code number of the machine tool.

(b) Copies of all orders must be sent to a Central Authority in the Defence Department, who will prepare annually a consolidated classified coded list and send it to the correlating authority appointed for the purpose.

4. For any special projects Government, Semi-Government or autonomous bodies such as river projects or special factory units such as Perambur Coach Factory. etc. lists of machine tools required should be processed through the Development Officer (Tools) and proper licences for their import should be obtained and form 'A' should be submitted for all items at the time of clearance.

5. For statistics of machine tools manufactured in this country, all Graded manufacturers have to submit monthly returns to the Development Officer (Tools)—it is suggested that in future code number should be given against items manufactured and the Development Officer (Tools) could prepare a classified list of machine tools manufactured in the country.

As regards the ungraded manufacturers, it will be very difficult to obtain returns of items manufactured by them, but an attempt could be made to obtain through the Factories Inspectorate of the different Provinces, returns of these firms who are on the Factory Inspector's list.

As the quantity and value of these is not likely to be very great even if this information is not absolutely correct, it won't materially affect the statistics.

6. As regards all the recommendations made above, it is understood that it will be a long time before statistics based on these recommendations are available, and to that extent does not solve the problem

of obtaining some statistics straightaway in order to plan the immediate programme of rationalised manufacture.

This matter has been considered at length by the Machine Tool Panel of this Committee and it is felt that meagre as the information may be—if a classified coded list of foreign and Indian Machine Tool purchased by the Government through the D.G.S. & D. for the last four years can be obtained, this information together with information from the Defence Department of all the Purchases made by them directly from abroad would be very helpful as it would represent about 60 per cent of India's purchases of Machine tools. We, therefore, strongly recommend that suitable help by way of technical assistance should immediately be given to the D.G.S. & D. and the Defence Department to help prepare this list from the information available with these Departments.

FORM 'A'

Code No.

Name of importer

If Government, State Department and special Project, if any

Quantity	Description	Cost per unit	Total Cost

ANNEXURE IV

Public Sector

1. Heavy Engineering Corporation Ltd. Ranchi.
2. Hindustan Machine Tools Ltd., Jalahalli P. O., Bangalore.
3. Indian Ordnance Factories Machine Tool Prototype Factory, Ambarnath.
4. The Praga Tools Corpn. Ltd., Secunderabad-3.

Private Sector

1. Ashok Manufacturing Co. Pvt. Ltd., New Delhi-1.
2. Acme Manufacturing Co. Ltd., Bombay–31 DD.
3. Addison and Co. Ltd., Madras–2.
4. Amar Electrical & Mechanical Engineering Works, Ludhiana.
5. Ameteep Machine Tools Pvt. Ltd., Delhi.
6. Atlas Works Private Ltd., Calcutta–16.
7. Batala Engineering Co. Ltd., Batala.
8. Bharat Fritz Werners (P) Ltd., Bangalore–22.
9. Britannia Engineering Co. Ltd., Britannia Works, Titaghar.
10. B. S. Machine Tools Corporation, Calcutta–28.
11. Cooper Engineering Ltd., Chinchwad.
12. Crescent Iron and Steel Corpn. Ltd., Bombay–62 N. B.
13. Daulat Industrial Corpn. Pvt. Ltd., Ludhiana.

14. G. G. Dandekar,
Dist. Thana (Maharashtra).

15. Damodar Enterprises Ltd.,
Calcutta–7.

16. Ex–Cell–O India Ltd.,
Bombay–18 (A.P.)

17. Godrej & Boyce Mfg. Co. Pvt. Ltd.,
Bombay–12 D.D.

18. Shree Hanuman Industries,
Calcutta–7.

19. The Hyderabad Allwyn Metal Works Ltd.,
Sanatnagar P.O., Hyderabad–18 (A.P.)

20. Industrial Plants Ltd.,
Calcutta–13.

21. Investa Machine Tools & Engg. Co. Ltd.,
Bombay–1.

22. Jessop and Co. Ltd.,
Calcutta–1.

23. Kirloskar Brothers Ltd.,
Kirloskarwadi.

24. Machinery & Equipment Manufacturers Pvt. Ltd.,
Ahmedabad–10.

25. Madras Machine Tool Manufacturers Ltd.,
Coimbatore–5.

26. Maya Engineering Works Pvt. Ltd.,
Calcutta–26.

27. Modern India Construction Co. Ltd.,
Calcutta–1.

28. The Mysore Kirloskar Ltd.,
Yantrapur P.O. Harihar.

29. The New Bemco Engineering Products Pvt. Ltd.,
Belgaum.

30. New Standard Engineering Co. Ltd.,
Bombay–13.

31. Ravi Industries Pvt. Ltd.,
Bombay.

32. Ronuk Industries Ltd.,
Bombay–18.

33. R. K. Machine Tools,
Ludhiana.

34. P. S. G. Industrial Institute,
Peelamedu, Coimbatore-4.

35. Sonalker C. R.,
Harihar (Mysore State).

36. Super Crafts Private Ltd.,
Calcutta-42.

37. Textile Machinery Corporation Ltd.,
24-Parganas (W. Bengal).

38. Textool Company Limited,
Coimbatore-6.

39. Perfect Machine Tools Co.,
Bombay-1.

40. V. A. P. Corporation Pvt. Ltd.,
Post & Rly. St. Udhna (Dist. Surat).

MGIPCBE—S2—6 M of I & S/65—10-11-65—500.