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# PROMOTION AND DEVELOPMENT OF MACHINE TOOL INDUSTRIES IN THAILAND 1/

by

S. Chanarksiri* and V. Lutasingh**

* Special Trade Engineer, Department of Industrial Promotion
Ministry of Industry, Bangkok
** Chief of Planning Division, Department of Industrial Promotion
Ministry of Industry, Bangkok

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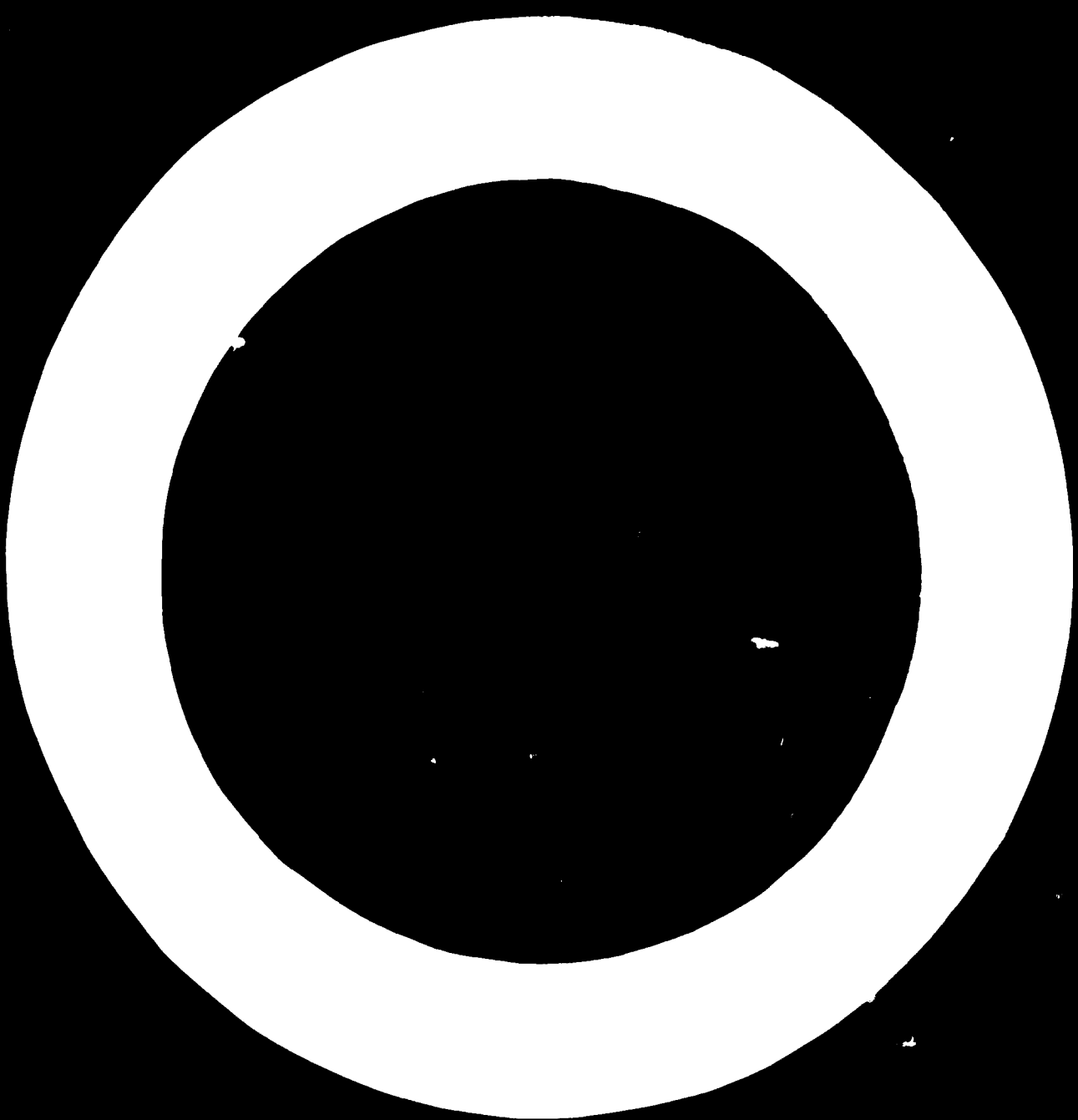
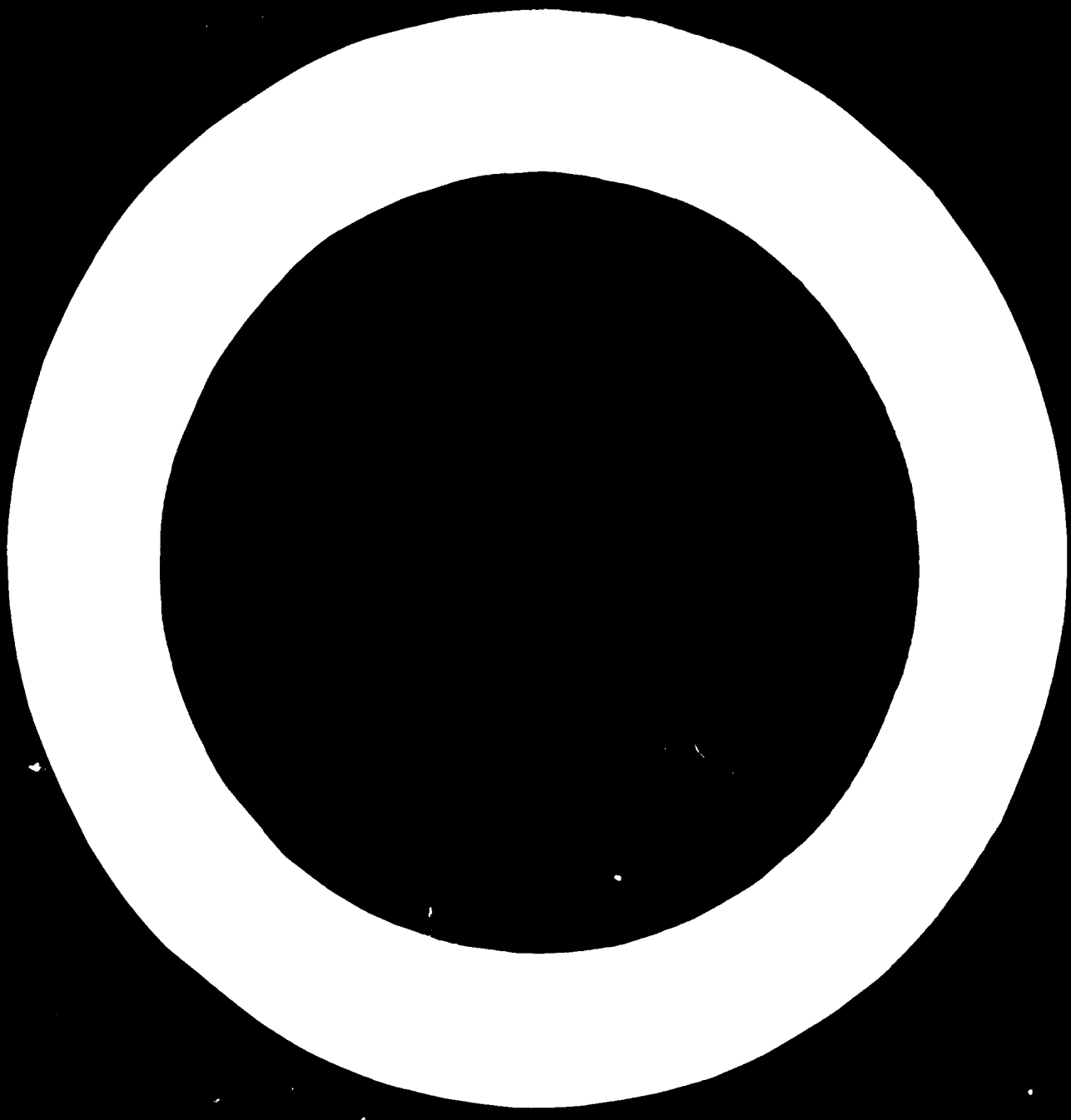




# Promotion and Development of Machine Tool Industries in Thailand

## I. Policies and General Aspects

### 1. Status of machine tools in Thailand

#### 1.1. Definition

Machine tools in the present context are defined as non-portable power operated machines for the working of metal either by chip formation, abrasion, impact pressure, electrical techniques or a combination of these processes. They may range from simple drilling machines and lathes to complex, fully automated machines and transfer lines capable of automatically producing work to consistent qualitative and quantitative criteria.

#### 1.2. Import

The market for machine tools in Thailand is at present concentrated in the machine shop sector of our industries which are mostly engaged in providing repairing services. The demand for machine tools from various manufacturing industries which employ machine tools in their manufacturing processes is fairly small owing to the relatively small number of local industries. Up to now, imported machine tools completely dominate the Thai market. The share of the market for locally manufactured machine tools is very small and estimated at only three per cent. Imported statistics indicate that during 1965 to 1972 the import of different kinds of machine tools increased very rapidly as shown in Table 1.

Table 1 : Value of import of machine tools and accessories

| Year | Total Value (in million Baht) 1/ | Annual Increase in % |
|---|---|---|
| 1965 | 54 | - |
| 1966 | 74 | 37 |
| 1968 | 103 | 39 |
| 1970 | 151 | 46 |
| 1971 | 175 | 16 |
| 1972 | 220 | 26 |
| 1973(up to October) | 226 | - |

1/ The rate of exchange is 20.45 Baht to 1 U.S. Dollar

The value of imported machine tools may not give the true picture of the demand for machine tools because of the sharp rise in prices of machine tools. However, Table 2 shows the number of different kinds of machine tools imported during the years 1970 - 72.

Table 2 : Imports of different kinds of machine tools

| Type of machine tools | Quantity (units) imported in | | |
|---|---|---|---|
| | 1970 | 1971 | 1972 |
| Lathes | 1,555 | 1,784 | 4,240 |
| Milling machines | 107 | 127 | 99 |
| Grinding machines | 4,227 | 4,671 | 5,376 |
| Drilling machines | 3,566 | 5,447 | 2,342 |
| Sawing machines | 1,971 | 2,164 | 3,472 |

It is interesting to note that the demand for all kinds of lathes has gone up very rapidly during the past 2 years and most of them were imported from the Republic of China (Taiwan). Of the total lathes imported in to Thailand in 1972, around 86 per cent were manufactured in Taiwan. The same is true for other types of imported machine tools. The detailed breakdown of different kinds of machine tools imported during the same period as well as their countries of origin are shown in Appendix I.

### 1.3. Local Production

There are around 10 machine tool factories in Thailand. The two largest factories which were promoted by the Government[2/] are not in current production. One of them altered its original plan of manufacturing machine tools to one of producing spare parts for local industries. The reasons given were the difficulty faced in marketing locally manufactured products combined with the highly competitive machine tool market created by the imports of lower priced machine tools from Taiwan, and the scarcity of skilled labour. Another one decided to go into the field of reconditioning and rebuilding machine tools by importing second hand machine tools from Europe and the United States.

2/ Promoted industries are those which are granted tax privileges by the Government

The other factories are of small scale, producing mostly engine lathes. Their maximum joint output is estimated at 360 units per annum. With an average price of 10,000 baht (about US$ 500) per unit, the annual sale of locally produced machine tools is in the vicinity of 3.6 million baht (about US$180,000).

The quality of lathes and shapers produced at present is not up to the international standard.

1.4. Ancillary Industries

One of the most important ancillary industries for machine tool manufacturing is the foundry industry. In Thailand, there are more than 200 small private foundries manufacturing gray iron castings with the total output of 20,000 tons per annum. Cupolas with the melting capacity ranging from 1 to 10 tons are being widely used.

There are four malleable cast iron foundries with the average daily production capacity of about 200 tons each. A modern foundry has put into operation a hot blast cupola completed with a machine molding equipment and a modern tunnel annealing furnace with precision temperature control. Another modern one has an induction furnace about 8 tons in capacity completed with automatic molding machine and electrical annealing furnace.

There are also five steel casting foundries with the total annual capacity of 10,000 tons. Among them, one has been in operation for many years, equipped with a four ton electric arc furnace, two high frequency induction furnaces and a complete set of very modern inspection equipment for controlling the quality of castings. The other four are newly established and equipped with the same production facilities.

Unfortunately, other ancillary industries such as forgings, manufacture of bearings, electrical components and tools have not grown in a relative pace compared with the foundry industry in Thailand. Most of the components used in the local machine tool industry are mostly imported at the moment.

1.5. Governmental policy related to machine tools

No where in the present and the past National Economic and Social Development Plans has there been any specific proposal and plan to expand and modernize machine tool industry in Thailand. The salient feature of various incentives provided by the government through the Promotion of Industrial Investment Acts of 1960, 1962 and 1965 and the Announcement of the Revolutionary Party No 227 for any newly established industries, including machine tool industries are:-

1) exemption of import duties and business taxes on machinery, component parts and accessories, materials, tools, instruments and prefabricated frames and equipment for factory construction.

2) exemption of income tax on profits for five to eight years beginning the first accounting year promoted industry sells products or earns revenue.

3) Permission to bring in alien skilled workers or experts into the country, together with their families, regardless of immigration law quota provision.

4) Permission to freely remit foreign currency covering return of capital, profits, and principal on foreign loans, royalties and other like necessary payments.

Previous experience shows that the above mentioned incentives are not sufficient to induce local entrepreneurs to establish machine tool industry. The two largest factories promoted by the Government under this incentive scheme which are no longer in current production as mentioned earlier are a good case in point. In order to promote machine tool industry, a different set of incentives will have to be provided. In addition, it may be necessary and essential that the Government may have in the initial stage to provide some form of protection which should be decreased at a predetermined rate.

## 2. External Technical Assistance in the Development of the Machine Tool Industry in the Country

At present, the production methods used in the local machine tool factories are quite primitive. Obsolete machinery and equipment are mostly used in these industrial establishments which are essentially family enterprises. These machine tool makers are more or less diversified concerns prepared to produce almost any type of tools required by copying the design of imported machine tools. The products manufactured is virtually an imitation of those imported.

So far, neither a single firm has obtained licenses from other foreign firms nor has hired any foreign consultants to assist them in their manufacturing operations. The only bilateral assistance obtained in manufacturing machine tools originated from the assistance of the Federal Republic of Germany in establishing the Thai-German Technical Institute. The Institute in their training programmes has encouraged their students to produce small engine lathes and shaping machines. No other direct technical assistance has been obtained.

3. Cooperation and Technical Assistance Needed

As mentioned above, no external technical assistance has been obtained and cooperation with the foreign companies in the machine tool industry has not been in existence. However it is essential that if the pace of industrialization is to be accelerated, the machine tool industry has to be given special importance. The obvious economic disadvantages derived from importing too sophisticated machine tools from the developed countries cannot be underestimated. It often results in underutilization of those machine tools. Therefore it is necessary that the manufacture of machine tools designed to suit the economic conditions of different developing countries must be encouraged.

In this connection, the Industrial Service Institute of the Department of Industrial Promotion which has been financially assisted by UNDP and executed by UNIDO has, in their original plan, a project to assist machine tool manufacturer. However, due to limited financial assistance the Institute received from UNDP in the past, nothing has been done concerning the development of machine tool industry. It would be extremely useful if UNIDO could provide the following expertise:

a) Expert to carry out a general survey of the existing stock of machine tools, its utilization and possible development keeping in mind the stage of development of metal-working industries.

b) Expert in the technology of machine tool manufacture including design, selection of materials, manufacturing processes and quality control.

These two experts could assist in the building up of the staff of the Institute in providing technical and management services to existing machine tool industry with the objective of upgrading the quality of machine tool manufactured and making their operation more competitive so as to be able to lower their prices. In this connection, fellowships for advanced training in machine tool manufacture would be needed so that the staff of the Institute will gain more insight and practical experience in the field of design and manufacture of machine tools.

II. Technical Aspects

Problems in the development and utilization of machine tools

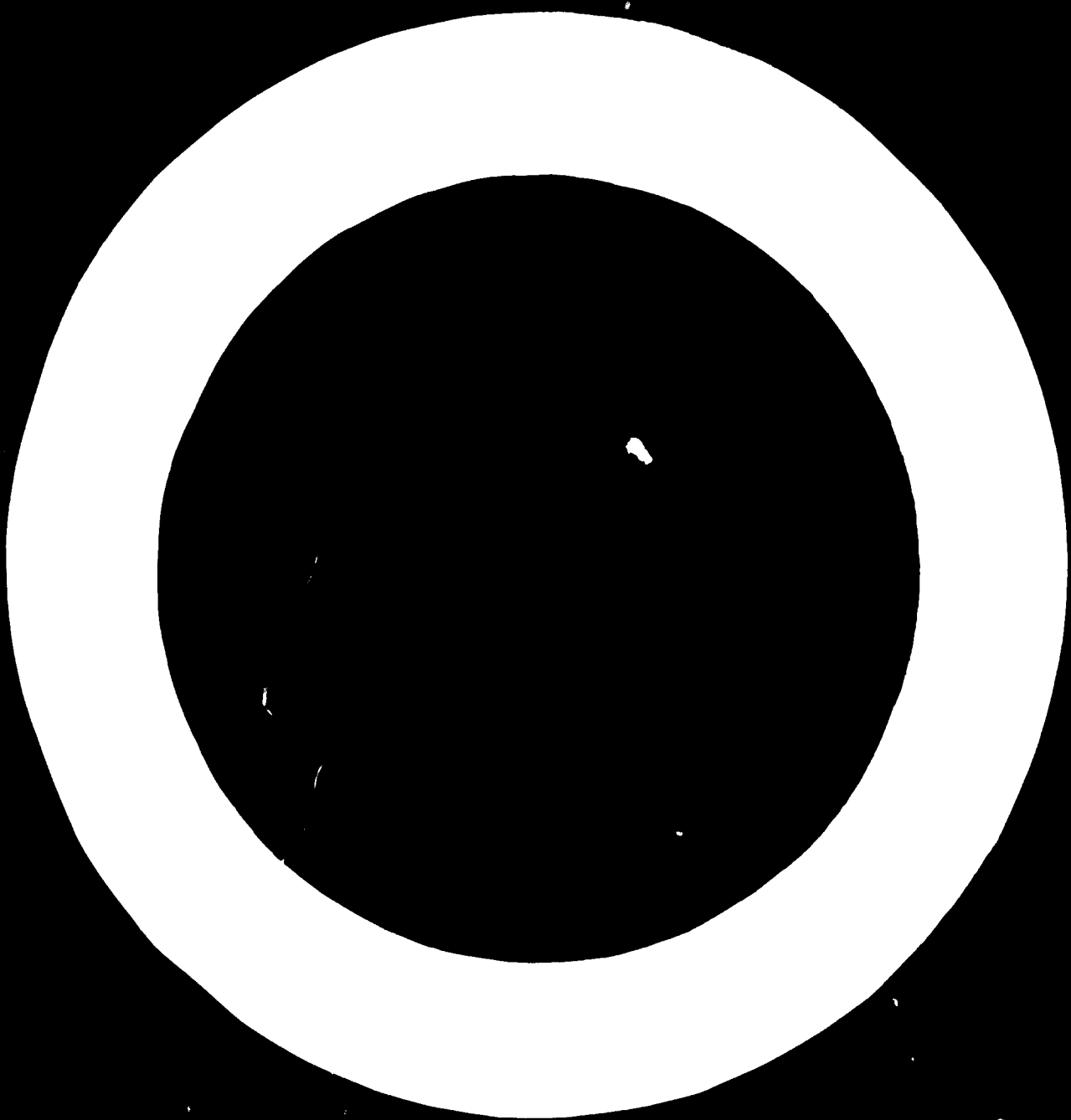
Initially, it is important that in a country where appropriate skills in the manufacture of machine tools are not available, it may be important to encourage the local entrepreneurs to start from reconditioning and rebuilding second hand machine tools and, in the process, upgrade skills of the local machinsts so that after a certain period of time the entrepreneurs will be able to go into the manufacture of machine tools.

According to the preliminary survey undertaken, most of the existing machine tool manufacturers are using those skilled workers who started learning their trade as apprentices in machine shops. At present, these skilled workers although limited in number become the backbone of the machine tool industry in Thailand. Another new source of supply of skilled workers for the industry is the seven technical institutes and numerous technical schools throughout the country. However, there is an artificial barrier between these two groups of skilled workers. On the one hand, those who started as apprentices looked down upon the graduates of various technical institutions regarding inadequate practical experience. On the other hand, the graduates of technical institutes feel that their educational background is superior to those of the skilled workers. So it is up to the technical institutions to provide more experience for their graduates and indoctrinate them the importance of working as a member of team in the new industrial situation. It is indeed the duty of the management to bridge the gap between these two groups of skilled workers. It is interesting to note that in many technical schools, especially those assisted by the IBRD, the machinery and equipment available for training are very modern. Unfortunately, the students after their graduation have to work in industrial establishment which are poorly equipped with much older machine tools.

Another difficulty faced by the existing machine tool industry is the high turnover of skilled labour. Since the pace of development of other industries is much higher, the need for skilled personnel, especially machinists, are consequently higher. So skilled workers from the existing machine tool industry which are paid lower because of low profitability in this industry are offered better pay elsewhere. If formal apprenticeship programme could be organized by the Government, the problem concerning high turnover of skilled personnel can be partially eliminated.

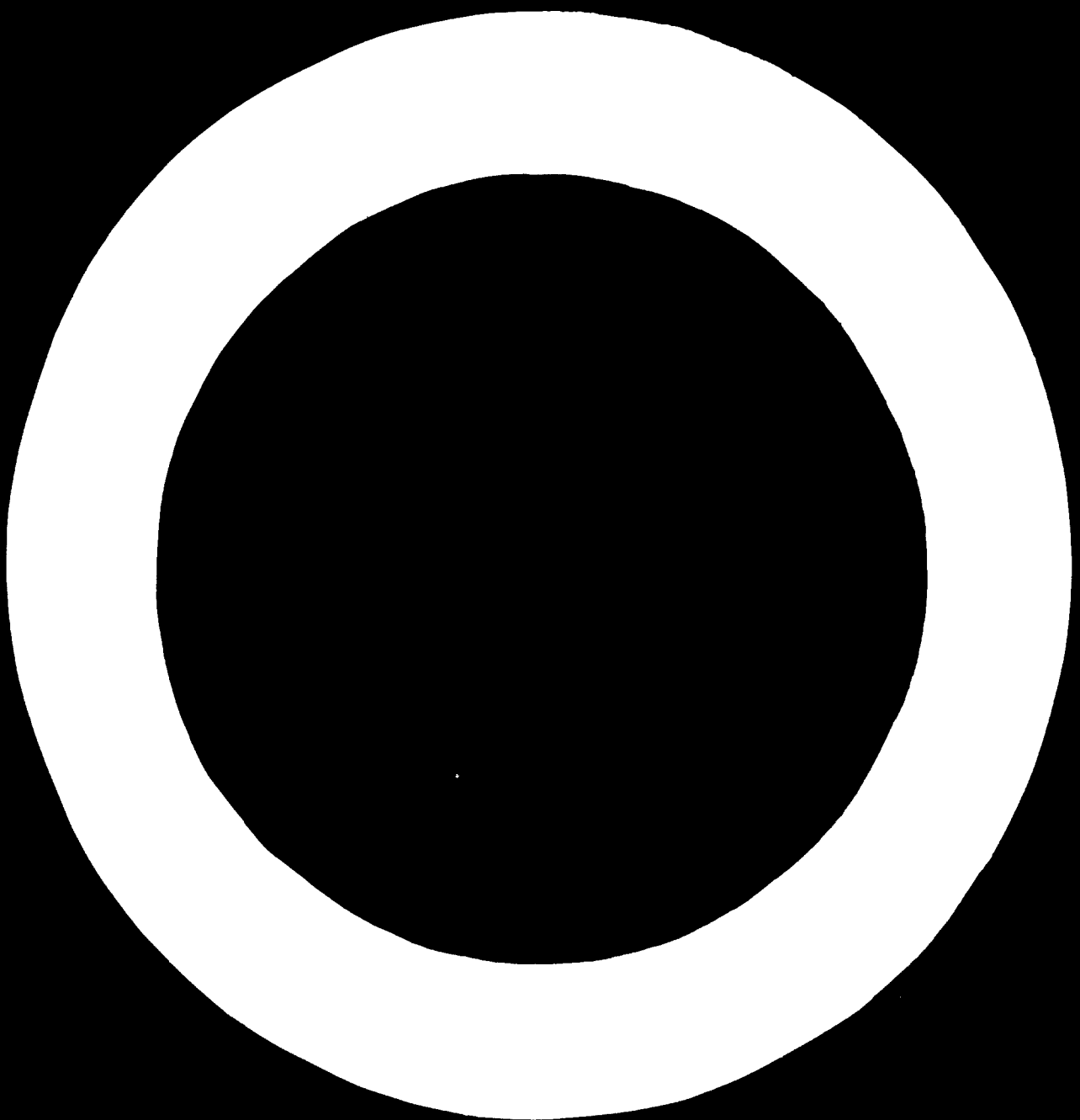
So far as design and adaptation are concerned, there is no difficulty for local machine tool manufacturers to imitate design of simple machine tools or to adapt them to local working conditions. As a matter of fact they are extremely good at it. However, for a more sophisticated machine tool, the technological background of the entrepreneurs are so limited that imitation and adaptation of design are not always possible

Underutilization of existing machine tools is indeed an ordinary phenomenon in Thailand. Unfortunately, it is derived from four main causes. First of all, various local industries using machine tools have not considered and most of the time do not realize whether any machine tool bought or ordered is suitable for the job and fail to consider various alternatives for its use. Secondly, they do not even care to study the utilization percentage of the available machine tools and see how the utilization can be improved. Thirdly, those imported machine tools are designed for the developed countries where the cost of hiring skilled machinists is quite high and prohibitive. Industries in the developing countries most of the time have no managerial and technological competence to consider which type of the imported machine tools are most suited to their operations. Last but not least is the low cost of capital resulting from exemption of import duties and business tax to promoted industries and low tariff levied on machinery and equipment. It is also inherent in the new entrepreneur-industrialists who prefer to buy modern machinery and equipment which may not be needed at all.



# Appendix I

## Import of Machine Tools, 1970-72



Appendix 1 : Import of Machine Tools during the years 1970 - 1972

| No. | Description | Country of origin | 1970 | | 1971 | | 1972 | |
|---|---|---|---|---|---|---|---|---|
| | | | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F Value(Baht) | Quantity | C.I.F Value |
| 1 | Lathes of all kind for metal making | Hong Kong | - | - | 6 | 143,457 | 2 | |
| | | India | 19 | 356,187 | 28 | 352,552 | 30 | |
| | | Singapore | - | - | 3 | 17,680 | - | |
| | | Japan | 490 | 3,516,391 | 235 | 3,182,083 | 104 | 4,7 |
| | | Taiwan | 411 | 3,047,467 | 913 | 5,277,422 | 2,646 | 10,- |
| | | Austria | 13 | 929,516 | 10 | 602,721 | 14 | |
| | | Belgium | 1 | 277,692 | - | - | 1 | |
| | | Czechoslovakia | 7 | 1,346,002 | 9 | 902,251 | 17 | 1,- |
| | | Denmark | 3 | 498,865 | 2 | 26,056 | 1 | |
| | | France | 10 | 25,169 | - | - | 1 | |
| | | W. Germany | 333 | 1,892,216 | 132 | 936,356 | 7 | 4,- |
| | | Italy | 4 | 142,023 | 12 | 174,495 | 13 | |
| | | Luxemberg | - | - | 12 | 66,059 | - | |
| | | Norway | 2 | 138,993 | - | - | - | |
| | | Poland | 1 | 44,085 | 31 | 1,308,438 | 31 | 1,- |
| | | Rumania | 4 | 204,783 | 77 | 1,862,853 | 34 | 92 |
| | | Spain | 49 | 1,343,462 | 70 | 2,059,004 | 22 | 1,05 |
| | | Sweden | 1 | 128,589 | 5 | 142,663 | - | |
| | | Switzerland | 1 | 30,038 | 3 | 101,056 | 10 | .1. |
| | | United Kingdom | 177 | 2,849,228 | 114 | 3,311,335 | 225 | 4,352. |

| No. | Description | Country of origin | 1970 | | 1971 | | [illegible] |
|---|---|---|---|---|---|---|---|
| | | | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F. Value(Baht) | Quantity |
| | | USSR | 3 | 38,920 | 2 | 60,320 | - |
| | | USA | 25 | 697,788 | 115 | 658,254 | [illegible] |
| | | Australia | 1 | 69,618 | 5 | 237,559 | - |
| | | Total | 1,555 | 17,647,032 | 1,784 | 21,479,616 | 1,[illegible] |
| 2 | Planing shaping slotting machines for metal working | Hong Kong | 5 | 862,650 | 1 | 2,058 | 11 |
| | | India | 6 | 118,078 | 11 | 190,692 | 1 |
| | | Singapore | - | - | 2 | 15,247 | - |
| | | Japan | 500 | 1,230,564 | 483 | 3,402,819 | [illegible] |
| | | Taiwan | 353 | 1,933,994 | 1,293 | 4,093,233 | 1,707 |
| | | Austria | 11 | 121,196 | - | - | - |
| | | Czechoslovakia | 1 | 313,483 | 4 | 426,083 | 7 |
| | | Denmark | 14 | 332,071 | 11 | 682,871 | 31 |
| | | W. Germany | 13 | 1,347,273 | 73 | 2,024,924 | 46 |
| | | Italy | 76 | 617,845 | 21 | 599,377 | 2 |
| | | Poland | 1 | 104,416 | - | - | - |
| | | Spain | 20 | 530,437 | 7 | 215,066 | 10 |
| | | Sweden | 20 | 275,018 | 7 | 321,389 | 6 |
| | | United Kingdom | 116 | 1,770,825 | 120 | 4,004,254 | 65 |

| No. | Description | Country of origin | 1970 | | 1971 | | 19 | |
|---|---|---|---|---|---|---|---|---|
| | | | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F. Value(Baht) | Quantity | |
| | | USA | 73 | 1,330,887 | 43 | 938,507 | | |
| | | Australia | 5 | 28,947 | 7 | 155,892 | | |
| | | Switzerland | - | - | 29 | 143,634 | | |
| | | Total | 1,214 | 10,917,684 | 2,112 | 17,216,7 | ,1 | 1 |
| 3 | Drilling boring machines for metal working | Hong Kong | 3 | 53,40 | - | - | - | |
| | | India | 14 | 49.464 | 7 | ,... | - | |
| | | Japan | ,470 | 4,019,810 | ..,745 | 5,2 ,2 | | |
| | | Taiwan | 888 | 1,110,077 | 1,314 | 1,154,4 | ,1 | |
| | | Austria | 1 | 116,356 | 1 | , 10 | - | |
| | | Czechoslovakia | 4 | 356,518 | 5 | ,7,7 | 1 | |
| | | Denmark | 7 | 865,312 | | 1,154, | | |
| | | W. Germany | 104 | 715,9.. | 1,5 | 1,61 , | | |
| | | Italy | 11 | 1,05 ,711 | 6 | 67 ,3 | | |
| | | Poland | 3 | 64,480 | - | - | - | |
| | | Switzerland | - | - | 2 | 33,11 | | |
| | | Sweden | 8 | 118,184 | 32 | 45 , | | |
| | | Spain | - | - | 5 | 31,39 | - | |
| | | United Kingdom | 33 | 602,427 | 28 | 714,032 | | |

| No. | Description | Country of origin | 1970 | | 1971 | | 1972 | |
|---|---|---|---|---|---|---|---|---|
| | | | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F. Value |
| | | USA | 20 | 397,856 | 3 | 84,275 | 17 | |
| | | Hungary | - | - | 80 | 23,660 | - | |
| | | Australia | - | - | 3 | 690,574 | - | |
| | | Total | 3,566 | 9,526,565 | 5,447 | 12,443,796 | 2,342 | 7, |
| 4 | Milling machines for working metal | Hong Kong | 5 | 674,990 | 2 | 12,146 | - | |
| | | India | 1 | 19,968 | - | - | - | |
| | | Japan | 5 | 2,170,665 | 9 | 288,941 | 6 | |
| | | Taiwan | 6 | 123,275 | - | - | 11 | |
| | | Austria | 1 | 229,237 | - | - | 6 | |
| | | Czechoslovakia | 3 | 620,482 | 1 | 62,083 | 1 | |
| | | Denmark | 20 | 38,672 | 7 | 67,587 | - | |
| | | Belgium | - | - | - | - | 1 | |
| | | W. Germany | 2 | 626,805 | 51 | 394,826 | 5 | |
| | | Rumania | - | - | - | - | 1 | 10 |
| | | Italy | 7 | 421,111 | 1 | 18,678 | - | |
| | | Switzerland | 1 | 709,008 | 1 | 68,344 | 2 | |
| | | United Kingdom | 45 | 1,327,839 | 47 | 444,209 | 19 | 6 |
| | | USA | 11 | 147,481 | 7 | 130,114 | 2 | 1 |

| N | Description | Country of origin | 1970 | | 1971 | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F. Value (B |
| | | Poland | - | - | 1 | 186,514 | - | - |
| | | Total | 107 | 7,169,533 | 127 | 1,774,757 | [illegible] | [illegible] |
| 5 | Sewing cutting machines for metal working | Hong Kong | 8 | 453,702 | 7 | 163,733 | - | [illegible] |
| | | India | 1 | 16,598 | 1 | 282,935 | - | - |
| | | Japan | 1,010 | 5,905,993 | 621 | 5,894,763 | 473 | [illegible] |
| | | Taiwan | 69 | 448,377 | 153 | 200,354 | 164 | [illegible] |
| | | Austria | 2 | 14,343 | - | - | 1 | [illegible] |
| | | Denmark | 38 | 186,716 | 30 | 252,889 | 13 | [illegible] |
| | | W. Germany | 715 | 1,191,377 | 1,004 | 1,620,857 | [illegible],436 | [illegible] |
| | | Italy | 12 | 263,010 | 17 | 215,747 | 6 | [illegible] |
| | | Netherland | - | - | - | - | [illegible] | [illegible] |
| | | Sweden | 2 | 78,434 | 1 | 87,692 | [illegible] | [illegible] |
| | | Rumania | - | - | - | - | 70 | [illegible] |
| | | United Kingdom | 8 | 564,948 | 52 | 2,571,100 | 71 | [illegible] |
| | | USA | 101 | 184,455 | 273 | 351,722 | 182 | [illegible] |
| | | Spain | - | - | - | - | 1 | [illegible] |
| | | Australia | 5 | 98,043 | 2 | 52,510 | [illegible] | [illegible] |
| | | Switzerland | - | - | - | - | 2 | [illegible] |
| | | Total | 1,971 | 9,405,996 | 2,164 | 11,732,950 | 3,427 | [illegible] |

| No. | Description | Country of origin | 1970 | | 1971 | | 197 | |
|---|---|---|---|---|---|---|---|---|
| | | | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F. Value |
| 4 | Drilling machine for metal working | India | 1 | 3,170 | 1 | 26,407 | - | |
| | | Indonesia | - | - | - | - | 2 | |
| | | Republic of China | 65 | 23,712 | - | - | - | |
| | | Japan | 1,974 | 2,520,324 | 1,625 | 1,799,373 | 443 | 3,5 |
| | | Taiwan | 1,905 | 949,517 | 2,344 | 1,140,805 | 4,109 | 2,5 |
| | | Austria | 1 | 78,355 | 5 | 73,415 | 1 | |
| | | Denmark | 21 | 2,467,597 | 6 | 721,351 | 35 | 1,4 |
| | | France | 5 | 33,924 | - | - | 1 | |
| | | W. Germany | 84 | 295,211 | 59 | 493,204 | 103 | 1,7 |
| | | Italy | 119 | 498,778 | 21 | 777,588 | 6 | 1 |
| | | Spain | - | - | 4 | 438,761 | - | |
| | | Netherland | 1 | 41,552 | - | - | 120 | |
| | | Sweden | 2 | 17,048 | 2 | 21,616 | 3 | |
| | | Switzerland | 2 | 476,304 | 5 | 66,579 | 1 | 4 |
| | | United Kingdom | 9 | 660,184 | 7 | 256,778 | 14 | 1, |
| | | USA | 37 | 1,109,942 | 61 | 137,144 | 58 | 1 |
| | | Australia | 1 | 8,112 | 31 | 99,949 | 50 | 1 |
| | | Total | 4,227 | 9,183,628 | 4,671 | 6,630,570 | 5,376 | 11,3 |

| No. | Description | Country of origin | 1970 | | 1971 | | 19[illegible] | |
|---|---|---|---|---|---|---|---|---|
| | | | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F. Value(Baht) |
| 7 | Riveting machines for metal working | Japan | [illegible] | 124,342 | 7 | 13,385 | 1[illegible] | 67,[illegible] |
| | | Sweden | - | - | - | - | 1 | [illegible] |
| | | United Kingdom | 1 | 1[illegible] | - | - | 1[illegible] | 11[illegible] |
| | | Taiwan | - | - | - | - | - | [illegible] |
| | | Total | 10 | 1[illegible] | 7 | 1[illegible] | [illegible] | [illegible] |
| 8 | Wire drawing machines | Japan | 1[illegible] | [illegible] | | 1,[illegible] | [illegible] | [illegible] |
| | | Taiwan | 15 | [illegible] | [illegible] | [illegible] | - | - |
| | | Belgium | 1 | [illegible] | - | - | - | - |
| | | Denmark | - | - | [illegible] | [illegible] | - | - |
| | | W. Germany | 5 | [illegible] | - | - | - | - |
| | | Total | 40 | 1,617,7[illegible] | 17 | [illegible] | [illegible] | [illegible] |
| 9 | Other machine tools for working metal or metallic carbides | Hong Kong | 26 | 1,77[illegible] | 1[illegible] | 5[illegible] | [illegible] | [illegible] |
| | | India | 16 | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| | | Israel | - | - | - | - | [illegible] | [illegible] |
| | | Malaysia | 1 | [illegible],000 | 7 | 137,758 | - | - |
| | | Singapore | 3 | 62,754 | 4 | 53,251 | [illegible] | 55[illegible] |
| | | Japan | 2,806 | 23,842,387 | 2,046 | 17,[illegible]52,928 | 1,[illegible]83 | 34,746,[illegible] |

| Description | Country of origin | 1970 | | 1971 | | 1972 | |
|---|---|---|---|---|---|---|---|
| | | Quantity | C.I.F. Value(Eight) | Quantity | C.I.F. Value(Eight) | Quantity | C.I.F. Value(Eight) |
| | Philippines | - | - | 2 | 64,840 | - | |
| | Taiwan | 608 | [illegible]762,853 | 1,119 | [illegible],144,139 | 1,717 | 7, |
| | Austria | 5 | 67,190 | 1 | 10[illegible],758 | | |
| | Bulgaria | - | - | - | - | 13 | |
| | Czechoslovakia | 2 | 351,866 | 3 | [illegible]45,537 | - | |
| | Belgium | - | - | 1 | 37,583 | - | |
| | Denmark | 103 | [illegible],184,[illegible]55 | 154 | [illegible],65[illegible],5[illegible]4 | [illegible] | [illegible], |
| | Finland | - | - | 1 | 48,595 | - | |
| | France | 5 | 176,655 | 4 | 21,[illegible]95 | [illegible] | |
| | W. Germany | 329 | [illegible],610,51[illegible] | 734 | [illegible],3[illegible]6,257 | [illegible] | [illegible] |
| | Hungary | 50 | 11,973 | - | - | - | |
| | Italy | 41 | 987,562 | 36 | [illegible]44,047 | 17 | |
| | Norway | - | - | 6 | [illegible],13[illegible] | - | |
| | Netherlands | 5 | 513,203 | - | - | 4 | |
| | Poland | 10 | 3,751 | 9 | 32[illegible],356 | [illegible] | |
| | Spain | 1 | 33,701 | 11 | [illegible]26,[illegible]19 | [illegible] | |
| | Sweden | 6 | 25,251 | 20 | 461,704 | [illegible] | |
| | Switzerland | 5 | 165,072 | 12 | [illegible]96,[illegible]27 | 16 | [illegible] |
| | United Kingdom | 138 | 9,638,012 | 225 | 6,437,133 | 170 | 5,7[illegible] |
| | Canada | - | - | 21 | 62,975 | - | |

| No. | Description | Country of origin | 1970 | | 1971 | | 1972 | |
|---|---|---|---|---|---|---|---|---|
| | | | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F. Value(Baht) |
| | | USA | 145 | 2,170,128 | 105 | 1,739,032 | 189 | 1,59[illegible] |
| | | Australia | 5 | 552,207 | 39 | 2,836,928 | 35 | 1,3[illegible] |
| | | Portugal | - | - | 1 | 1,274 | - | |
| | | Total | 4,310 | 49,145,184 | 4,620 | 47,881,567 | 4,300 | 73,14[illegible] |
| 10 | Machine tools for working stone ceramics concrete etc. | Hong Kong | - | - | - | - | [illegible] | [illegible] |
| | | Japan | 151 | 963,140 | 24 | 2,808,293 | 11 | [illegible] |
| | | Austria | - | - | 11 | 118,15[illegible] | - | - |
| | | Denmark | 1 | 138,003 | - | - | - | - |
| | | Taiwan | - | - | - | - | - | - |
| | | France | 1 | 15,198 | - | - | - | - |
| | | W. Germany | 45 | 1,076,264 | 26 | 994,429 | 11 | [illegible] |
| | | Italy | 3 | 86,082 | 2 | 19,307 | [illegible] | [illegible] |
| | | United Kingdom | 8 | 28,527 | 6 | 40,847 | 5 | [illegible] |
| | | USA | 30 | 257,988 | 4 | 43,767 | [illegible] | [illegible] |
| | | Australia | 2 | 74,540 | 3 | 60,515 | - | - |
| | | Taiwan | - | - | - | - | [illegible] | [illegible] |
| | | Total | 241 | 2,639,742 | 76 | 4,085,31[illegible] | 154 | [illegible] |

| No. | Description | Country of origin | 1970 | | 1971 | | 1972 | |
|---|---|---|---|---|---|---|---|---|
| | | | Quantity | C.I.F. Value (Baht) | Quantity | C.I.F. Value (Baht) | Quantity | C.I.F. Value |
| 11 | Machine tools for working glass in the cold | Hong Kong | 3 | 10,240 | 1 | 11,898 | - | |
| | | Malaysia | - | - | 1 | 32,540 | - | |
| | | Japan | 42 | 139,472 | 30 | 3,904,373 | 13 | |
| | | Taiwan | - | - | 10 | 11,856 | 3 | 5 |
| | | Belgium | 4 | 90,922 | 5 | 29,807 | 1 | |
| | | W. Germany | 1 | 65,359 | - | - | - | |
| | | United Kingdom | 1 | 29,578 | 2 | 66,007 | - | |
| | | USA | 5 | 40,414 | 2 | 98,381 | 14 | |
| | | Australia | 4 | 135,084 | - | - | 16 | |
| | | Total | 60 | 511.069 | 51 | 4,144,382 | 57 | 1,... |
| 12 | Sawing machines for working wood cork bone ebonite etc. | Hong Kong | - | - | 2 | 5,145 | - | |
| | | India | 15 | 28,960 | 20 | 35,624 | - | |
| | | Singapore | - | - | 1 | 10,400 | - | |
| | | Japan | 151 | 470,105 | 73 | 245,865 | 230 | 7... |
| | | Taiwan | - | - | 8 | 110,594 | 12 | 3... |
| | | Austria | 17 | 245,250 | - | - | 6 | 2... |
| | | Belgium | - | - | 1 | 43,914 | - | |
| | | W. Germany | 13 | 528,470 | 28 | 823,519 | 236 | 2,55... |
| | | Italy | 53 | 431,892 | 75 | 1,210,785 | 52 | 41... |

| No. | Description | Country of origin | 1970 | | 1971 | | 197 | |
|---|---|---|---|---|---|---|---|---|
| | | | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F. Value( |
| | | Sweden | 31 | 223,577 | 2 | 101,329 | 3 | 4 |
| | | United Kingdom | 5 | 44,784 | 3 | 22,235 | 5 | 2 |
| | | USA | 19 | 135,621 | 45 | 141,554 | 25 | 7 |
| | | Australia | 3 | 256,437 | 3 | 43,158 | - | |
| | | Malaysia | - | - | 1 | 8,160 | 1 | |
| | | Total | 307 | 2,365,096 | 262 | 2,802,282 | 570 | 3,96 |
| 13 | Lathes for working wood cork bone ebonite etc. | Japan | 25 | 301,163 | 4 | 61,517 | 1 | 11 |
| | | Taiwan | - | - | - | - | 1 | 1 |
| | | Austria | 2 | 15,024 | - | - | - | |
| | | Denmark | - | - | - | - | 2 | 2 |
| | | W. Germany | 1 | 377,315 | - | - | 1 | |
| | | Italy | 5 | 44,748 | 4 | 1,269,259 | 1 | |
| | | United Kingdom | 2 | 6,536 | 2 | 6,406 | | 6 |
| | | USA | 7 | 69,740 | 16 | 773,444 | 3 | 11 |
| | | Sweden | - | - | - | - | 4 | 2 |
| | | Total | 42 | 814,526 | 26 | 2,110,626 | 44 | 33 |

| N | Description | Country of origin | 1970 | | 1971 | | 1972 | |
|---|---|---|---|---|---|---|---|---|
| | | | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F. Value(B |
| 14 | Drilling machines for working wood cork bone etc. | Hong Kong | - | - | 5 | 13,267 | - | |
| | | India | 2 | 5,785 | 1 | 10,546 | - | |
| | | Malaysia | - | - | 2 | 8,000 | - | |
| | | Japan | 71 | 476,445 | 2 | 10,889 | 67 | 3 |
| | | Taiwan | - | - | 1 | 14,144 | 2 | |
| | | Italy | 5 | 123,826 | 2 | 17,642 | - | |
| | | Netherlands | - | - | 2 | 1,697 | 4 | |
| | | United Kingdom | 1 | 10,035 | 2 | 44,242 | 7 | |
| | | W. Germany | - | - | 4 | 293,498 | 1 | 1 |
| | | USA | 6 | 1,561,430 | 211 | 476,235 | 1 | |
| | | Australia | - | - | 21 | 799,660 | 13 | 1 |
| | | New Zealand | - | - | 1 | 1,530 | - | |
| | | Total | 85 | 2,175,521 | 253 | 1,691,350 | 95 | 21 |
| 15 | Other machine tools for working wood cork bone etc. | Hong Kong | 1 | 62,400 | 1 | 7,000 | 7 | |
| | | India | 17 | 36,200 | - | - | 35 | 7 |
| | | Malaysia | 1 | 3,500 | 1 | 12,000 | - | |
| | | Japan | 249 | 2,634,904 | 155 | 3,513,705 | 233 | 3,86 |
| | | Taiwan | 15 | 48,686 | 31 | 387,712 | 18 | 3 |
| | | Austria | 7 | 435,229 | 2 | 7,000 | - | |

| No. | Description | Country of origin | 1970 | | 1971 | | 1972 | |
|---|---|---|---|---|---|---|---|---|
| | | | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F Value(Ba |
| | | Czechoslovakia | 1 | 97,136 | - | - | 1 | 276, |
| | | Denmark | - | - | 12 | 1,102,924 | 9 | 350, |
| | | W. Germany | 9 | 1,832,039 | 23 | 1,603,825 | 19 | 2,314, |
| | | Italy | 125 | 1,464,557 | 87 | 5,007,302 | 66 | 7,146, |
| | | Luxemburg | 1 | 53,422 | - | - | - | |
| | | France | - | - | 1 | 8,112 | - | |
| | | Netherlands | 2 | 204,344 | 4 | 611,627 | 1 | 35 |
| | | Poland | [illegible] | 46,987 | 5 | 235,893 | - | |
| | | Spain | 1 | 46,818 | - | - | - | |
| | | Sweden | 5 | 583,452 | 5 | 491,963 | 1 | 3 |
| | | United Kingdom | 8 | 875,095 | 24 | 761,504 | 14 | 70 |
| | | USA | 52 | 405,940 | 46 | 243,948 | 58 | 18 |
| | | Australia | 2 | 11,232 | 72 | 859,179 | 11 | |
| | | Canada | - | - | 24 | 761,504 | - | |
| | | Total | 4[illegible] | 8,841,941 | 473 | 14,878,976 | 47[illegible] | 15, |
| 16 | Chucks | Hong Kong | - | - | - | - | 71 | |
| | | India | 11,986 | 192,236 | 20,845 | 382,583 | 19,564 | |
| | | Japan | 32,684 | 1,639,577 | 61,850 | 3,139,665 | 47,99[illegible] | 1,67 |
| | | Taiwan | 3,035 | 133,563 | 6,571 | 167,093 | [illegible],32[illegible] | |

| No. | Description | Country of origin | 1970 | | 1971 | | 197 | |
|---|---|---|---|---|---|---|---|---|
| | | | Quantity | C.I.F. Value (Baht) | Quantity | C.I.F. Value (Baht) | Quantity | C.I.F. Value (Baht) |
| | | Czechoslovakia | 2,940 | 69,45[illegible] | 1,622 | 36,920 | [illegible] | |
| | | Denmark | [illegible] | [illegible],226 | 109 | 17,19[illegible] | [illegible] | |
| | | France | [illegible] | 1,697 | - | - | [illegible] | |
| | | W. Germany | 4,[illegible]36 | [illegible]61,35[illegible] | [illegible]905 | 72,345 | [illegible],11[illegible] | |
| | | Hungary | 775 | [illegible]2,235 | - | - | - | |
| | | Italy | - | - | [illegible]0 | [illegible]4,514 | [illegible]7[illegible] | |
| | | Netherlands | 15 | [illegible],329 | 1[illegible]5 | 13,40[illegible] | 5[illegible] | |
| | | Rumania | 100 | [illegible],019 | - | - | 5 | |
| | | Sweden | [illegible]5 | [illegible],824 | 356 | [illegible]2,[illegible]74 | - | |
| | | Spain | - | - | 1[illegible]0 | 4,347 | - | |
| | | USSR | 17,512 | 160,314 | 16,49[illegible] | 1[illegible]2,9[illegible]2 | 7,561 | |
| | | Switzerland | 17 | [illegible],344 | 5 | 779 | [illegible] | |
| | | United Kingdom | 4,39[illegible] | 185,204 | 1,067 | [illegible]4,367 | [illegible],0[illegible]0 | [illegible] |
| | | Australia | - | - | 1,350 | [illegible]20,663 | [illegible]0[illegible] | |
| | | USA | 451 | 68,961 | 116 | [illegible],772 | [illegible]4[illegible] | |
| | | Luxemburg | - | - | [illegible]0 | 16,015 | - | |
| | | Poland | - | - | 11,9[illegible]7 | 254,421 | [illegible],73[illegible] | [illegible] |
| | | Total | 78,317 | 2,646,337 | [illegible]24,744 | 5,374,585 | 9[illegible],95[illegible] | [illegible],[illegible] |

| No. | Description | Country of origin | 1970 | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F. Value(Baht) |
| 17 | Other accessories & parts of machine tools for working metal wood cork bone etc. | Hong Kong | 3,763 | 72,135 | 5,590 | 327,545 | 463 | 66,[illegible] |
| | | India | - | - | 11,795 | 180,824 | 42 | [illegible] |
| | | Japan | 93,[illegible]02 | 7,123,726 | 27,393 | 2,141,726 | 20,[illegible]24 | [illegible] |
| | | Singapore | - | - | 135 | 34,439 | 66 | [illegible] |
| | | Taiwan | 1,[illegible]79 | 40,621 | 8,997 | 568,235 | 6,714 | [illegible] |
| | | Philippines | - | - | 230 | 42,837 | - | - |
| | | Austria | 5,624 | 707,520 | 1,371 | 222,985 | 70 | [illegible] |
| | | Czechoslovakia | 1,782 | 52,864 | 1,654 | 63,502 | 197 | [illegible] |
| | | Denmark | 221 | 16,916 | 424 | 62,864 | [illegible]27 | [illegible] |
| | | France | 36 | 7,057 | 182 | 25,070 | - | - |
| | | E. Germany | 35 | 3,713 | - | - | - | - |
| | | W. Germany | 3,148 | 515,913 | 9,556 | 1,516,600 | 20,[illegible]13 | [illegible] |
| | | Malaysia | - | - | - | - | 951 | [illegible] |
| | | Italy | 740 | 97,103 | 2,882 | 149,507 | 5,240 | [illegible] |
| | | Belgium | - | - | - | - | 4 | [illegible] |
| | | Luxemburg | 34 | 633 | 10 | 12,060 | - | - |
| | | Netherlands | - | - | 144 | 25,275 | - | - |
| | | Spain | 268 | 12,768 | 25 | 8,790 | - | - |
| | | Poland | - | - | 30 | 4,395 | 420 | [illegible] |
| | | Sweden | 158 | 14,783 | 16,691 | 1,057,491 | 3,341 | [illegible] |
| | | Switzerland | 417 | 141,921 | 238 | 49,565 | 59 | [illegible] |

| No. | Description | Country of origin | 1970 | | 1971 | | 1972 | |
|---|---|---|---|---|---|---|---|---|
| | | | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F. Value(Baht) |
| | | United Kingdom | 13,671 | 903,033 | 15,607 | 835,549 | 2,748 | 9[illegible] |
| | | USA | 10,96[illegible] | 746,530 | 1,381 | 248,224 | 9,326 | 5[illegible] |
| | | Australia | 10,201 | 973,599 | 3,112 | 398,232 | 3,152 | 1,40[illegible] |
| | | Rumania | - | - | 241 | 47,678 | 10 | [illegible] |
| | | USSR | - | - | 5,040 | 45,984 | - | |
| | | Total | 146,09[illegible] | 11,430,835 | 113,034 | 8,069,377 | 89,052 | 11,65[illegible] |
| 18 | Drilling boring machines pneumatic | Japan | 70 | 209,760 | 189 | 439,824 | 130 | 51[illegible] |
| | | Czechoslovakia | 1 | 183,930 | - | - | - | |
| | | Finland | 46 | 212,772 | 22 | 94,290 | 100 | 32[illegible] |
| | | W. Germany | 17 | 149,953 | 16 | 248,635 | 9 | 13[illegible] |
| | | Austria | - | - | - | - | 4 | 31[illegible] |
| | | Sweden | 91 | 2,656,542 | 193 | 1,841,609 | 147 | 69[illegible] |
| | | Switzerland | 5 | 1,936 | - | - | 2 | 1[illegible] |
| | | United Kingdom | 110 | 1,481,278 | 141 | 791,439 | 342 | 1,42[illegible] |
| | | USA | 10 | 38,723 | 23 | 584,095 | 4 | 4[illegible] |
| | | Total | 350 | 4,934,894 | 584 | 3,999,892 | 738 | 3,457[illegible] |
| 19 | Grinding machines pneumatic | Japan | 156 | 160,829 | 70 | 91,638 | 175 | 133[illegible] |
| | | W. Germany | - | - | 3 | 5,801 | - | |

| No. | Description | Country of origin | 1970 | | 1971 | | 1972 | |
|---|---|---|---|---|---|---|---|---|
| | | | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F. Value(Baht) | Quantity | C.I.. Value( |
| | | Netherlands | 1 | 2,754 | - | - | 1 | 4, |
| | | Taiwan | - | - | - | - | 620 | 27, |
| | | Sweden | 25 | 47,953 | 93 | 270,332 | 91 | 230, |
| | | Italy | - | - | - | - | 20 | 67, |
| | | United Kingdom | 112 | 552,728 | 3 | 9,205 | 10 | 29, |
| | | USA | - | - | 12 | 26,071 | 4 | 5. |
| | | Total | 294 | 764,264 | 181 | 403,047 | 921 | 76 |
| 20 | Concrete vibrators | Japan | 50 | 195,229 | 66 | 231,060 | 85 | 12, |
| | | France | 3 | 117,936 | - | - | - | - |
| | | W. Germany | 4 | 53,674 | 1 | 5,578 | - | |
| | | Italy | 8 | 41,419 | - | - | - | - |
| | | Luxemburg | 10 | 182,118 | - | - | - | - |
| | | Sweden | 278 | 595,102 | 65 | 361,354 | 85 | 11, |
| | | United Kingdom | 4 | 16,215 | 29 | 107,559 | 5 | 6, |
| | | USA | 48 | 245,622 | 42 | 195,792 | 61 | 353, |
| | | Switzerland | - | - | - | - | 4 | 74, |
| | | Total | 405 | 1,447,315 | 203 | 901,343 | 202 | 1,78 |

| No. | Description | Country of origin | 1970 | | 1971 | | 19 |
|---|---|---|---|---|---|---|---|
| | | | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F. Value(Baht) | Quantity |
| [illegible] | [illegible] | Hong Kong | - | - | 51 | 76,555 | - |
| | | Japan | 1,[illegible] | 2,112,504 | 1,980 | 3,202,584 | 2,93[illegible] |
| | | Denmark | 2 | 16,120 | - | - | - |
| | | Singapore | - | - | 5 | 548 | - |
| | | Findland | 41 | 177,767 | 55 | 160,206 | 92 |
| | | France | - | - | 1 | 5,335 | 1 |
| | | W. Germany | 1,132 | 1,626,008 | 425 | 6,920,920 | 354 |
| | | Italy | 57 | 269,797 | 13 | 180,866 | 113 |
| | | Luxemburg | 10 | 30,279 | 24 | 6,084 | 73 |
| | | Sweden | 118 | 1,014,643 | 223 | 956,525 | 215 |
| | | Switzerland | 24 | 48,075 | 1 | 12,934 | - |
| | | United Kingdom | 281 | 517,028 | 574 | 1,871,744 | 508 |
| | | Canada | 6 | 6,011 | 24 | 37,212 | 38 |
| | | USA | 2,638 | 4,014,782 | 767 | 1,935,541 | 2,349 |
| | | Australia | 242 | 680,216 | 263 | 160,665 | 109 |
| | | Total | 6,031 | 10,513,230 | 4,406 | 15,527,719 | 6,830 |
| 22 | Parts & accessories for pneumatic tools | Japan | 3,411 | 489,002 | 5,318 | 442,304 | 3,340 |
| | | Denmark | 10 | 10,897 | 18 | 17,437 | - |
| | | Finland | 456 | 90,069 | 276 | 80,494 | 255 |

| No | Description | Country of origin | 1970 | | 1971 | | 1972 | |
|---|---|---|---|---|---|---|---|---|
| | | | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F. Value(Baht) | Quantity | C.I.F. Value(Baht) |
| | | France | 4 | 4,982 | - | - | - | - |
| | | W. Germany | 605 | 203,417 | 1,779 | 407,209 | 1,267 | 391,2 |
| | | Luxemburg | 294 | 14,263 | 7 | 3,161 | - | - |
| | | Italy | - | - | 549 | 435,287 | 146 | 39, |
| | | Netherlands | 24 | 42,312 | 976 | 15,108 | - | - |
| | | Sweden | 5,120 | 979,785 | 3,499 | 676,170 | 815 | 30 |
| | | Switzerland | 11 | 3,225 | - | - | 12 | 6, |
| | | United Kingdom | 3,434 | 539,013 | 1,388 | 378,652 | 2,853 | 52 |
| | | USA | 2,491 | 305,864 | 18,619 | 1,340,635 | 1,927 | 46 |
| | | Union of South Africa | - | - | - | - | 922 | 1 |
| | | Australia | 172 | 12,761 | 22 | 1,912 | 480 | 1 |
| | | Canada | - | - | 20 | 6,688 | 52 | 47, |
| | | Total | 16,032 | 2,695,590 | 32,471 | 3,805,057 | 12,076 | 2,461, |

74.11.27