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COUNTRY STUDY REPORT ON THE MACHINE TOOL INDUSTRY IN BANGLADESH 1/

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PART I

POLICIES AND GENERAL ASPECTS

STATUS OF MACHINE TOOLS IN THE COUNTRY

Existing Stock

The estimated number of general engineering workshops in Bangladesh using machine tools is approximately 2,000.

The users of machine tools in Bangladesh may be categorized as follows:

a. Small enterprises manufacturing simple machines, in most cases to order;

b. Repair workshops which are exclusively engaged in repairs of all kinds of machinery being utilized in the country, or are manufacturing spare parts for various sectors of industry;

c. Vocational institutes, technical colleges and schools.

The enterprises under all the above categories have in their plants mostly universal machine tools which could be evident from the types of jobs usually undertaken by them. No reliable statistics of the population of machine tools are available in the country. However, a survey was conducted in 1969-70 with a view to assess the demand of lathes, drills and hacksaws in the country. The population of these machine tools as arrived at by this survey is as follows:

Lathes: Small - 3,300, Medium - 1,450, Large - 1,800;
Drills: Radial - 170, Column - 1,500, Bench - 480
Hacksaws: 480

Demand, Production, Import and Export

The size of the country's metalworking industry using machine tools for production of machinery is very small. The major industries under this category are limited to a pump manufacturing unit, two fan manufacturing units, a Jute Mill machinery manufacturing unit and a tea machinery unit. During the First Five Year Plan (1973-1978) of the country, the machinery manufacturing capacity is expected to increase to a great extent by the completion of the following projects. The consumption of machine tools will increase accordingly.

General Electric Manufacturing Plant
Bangladesh Machine Tool Factory
Bangladesh Diesel Plant
Three Wheeler Factory
Two Wheeler Factory

Pipe Fitting Plant
Power Sprayer Factory
Textile Machinery Manufacturing at Galfra Habib
Industrial Fasteners Plant
Small Tractor Plant

The total requirement of metalworking machinery during the First Five Year Plan is estimated to be valued at Taka 460 million. The estimate is made up as follows:

Metalworking manufacturing units in the public sector	- Taka 360 million
Metalworking manufacturing units in the private sector	- Taka 60 million
Workshops attached to other sectors of the industry	- Taka 10 million
Vocational institutes, technical colleges, etc.	- Taka 30 million

Most of these requirements will be met by import from abroad. The contribution of the local machinery manufacturing industry in meeting the total requirements of machine tools is estimated to be Taka 30 million, for the entire Five Year Plan period. The major portion of these machine tools will be supplied by the Bangladesh Machine Tool Factory. This factory, which is now under construction, will manufacture centre lathes, bench, column and radial drills, hacksaw machines, eccentric presses, and shaping machines. The construction of this project started in 1967, but due to the political situation prevailing at that time, the progress received a set back. The project is now scheduled to be completed in 1976-77, at a cost of Taka 570 million.

It is difficult to estimate the demand for machine tools in view of the lack of statistics on past imports from abroad and from erstwhile West Pakistan. Any estimate under this situation will only be guesswork. In 1969-70, a survey was made to estimate the population and demand of machine tools with a view to formulate a realistic production programme for Bangladesh Machine Tool Factory. An estimate, based on the findings, is given below. This assumes an average growth rate of 5 percent and a replacement rate of 1.5 percent per annum.

Machine Tool	Estimated Annual Growth Demand	Estimated Annual Replacement Requirement	Annual Total Demand
Lathes			
Small	165	49	214
Medium	72	21	93
Large	90	27	117
Drill			
Radial	8	3	11
Column	75	22	97
Bench	75	22	97
Hacksaws	24	7	31

On record, there are presently six machine tool manufacturers in the country but only two units are now producing machine tools of appreciable quantity. Rahim Metal Industries turns out approximately 75 lathes, power presses and ball presses per annum. The other unit is the Bangladesh Machine Tool Factory, which assembles centre lathes, column and bench drills, hacksaws and radial drills from imported, finished parts. In 1979-80, this factory is expected to go into complete machufacture of all machined parts, and the tentative production programme is given below:

Lathe: Small - 90, Medium - 45, Large - 56
Drill: Bench - 45, Column - 45, Radial - 10
Hacksaw machine: 30
Shaping Machine: 30
Power Press: 30

It should be mentioned here that the capacity of the factory is considerably more than given in this programme, and in the event that the market is able to consume more, the programme will be augmented accordingly.

As regards the programme beyond 1979-80, nothing has been firmed up yet, but it is expected that the production of machine tools as mentioned above will increase at an average rate of 10 to 12 percent annually. The factory will gradually include in its programme items such as milling machines, turret lathes, boring machines, surface grinding machines, cylindrical grinding machines. The prgramme show on the last page of this report is a rough estimate only.

Ancilary Industries as Foundries, Forgings, Bearing, Electrical Equipment and Components, Tools, etc.

One of the main reasons for the lack of growth in the machinery manufacturing sector in the inavailablity of quality cast and forged parts in the

country. There are at present three or four foundries producing machinery castings, but none of these are capable of producing uniform and high grade castings required for machine tool manufacture. This is due to the lack of laboratory facilities, machining moulding, shot blastings, etc. At the end of the First Five Year Plan, there will be two mechanised and modern foundries and forges in the country. These foundries and forges, whose capacities are given below, will be a part of the Bangladesh Machine Tool Factory.

Foundry III	It will have a capacity of 2,500 tons finished castings per year on two shift basis and will produce gray iron and non-ferrous castings weighing less than 50 kg.
Foundry I	This foundry will have an annual capacity of 6,500 of finished castings per year on two shift basis and will produce grey iron castings weighing less than 2 tons but more than 50 kg.
Forge	The forge shop will have a capacity of 1,500 tons per year on sigle shift basis.

The forge and foundries of this factory will also have such service facilities as a pattern shop for production of wooden and metallic patterns, a sand testing laboratory, a chemical and strength laboratory, a die shop, a forge heat treatment shop for relieving stresses in forged and cast parts.

The requirement of cutting tools in the country is now being met totally from import. On completion of the Bangladesh Machine Tool Factory, its cutting tools secion will produce the following tools:

Turning Tools (HSS and Carbide tipped)	100,000
Drills (HSS)	300,000
Taps	5,000 sets
Dies	5,000 sets

As regards bearings, electrical equipment and components, for use in machine tools, the industry will continue to rely on import in view of the absence to local manufacturing facilities for these commercial component parts.

Government Policy Related to Machine Tools (Priorities, Incentives, Taxes

Government of Bangladesh has given priority consideration on completion of the Bangladesh Machine Tool Factory, which will be the centre for machine tools and machinery manufacturing industry in the country. Initially,

this factory will meet the country's demand for simple machine tools, but later it will take up manufacture of more complicated and special purpose machine tools.

The Government of Bangladesh has not announced any special policy on machine tools, in view of the fact that the local industry meets only a small fraction of the demand which is mostly being met by import from other countries. Like all other engineering industries, the local machine tool industry also enjoys such protection as that the import of any type and size of machine tool will not be imported to the extent the industry is capable of meeting the local requirement.

EXTERNAL TECHNICAL ASSISTANCE IN THE DEVELOPMENT OF THE MACHINE TOOL INDUSTRY

The planning for development of machine tool industry in the country is centred around the Bangladesh Machine Tool Factory. The first phase of the factory will be completed in 1976-77 and the future expansion of the industry will be made by expanding this factory.

in L967 the Bangladesh Machine Tool Factory acquired licenses for the following items from the French Machine Tool Manufacturers: Centre lathe (14 inch to 20 inch swing diameter from Muller et Pesant; Radial drills from CSP; Bench drill from ADAM; Column drill from ADAM; and Hacksaw machine from DEMURGER.

Under the technical know-how agreement, the French licensors have trained local engineers and techniciams in their plant for a period of 60 m/m. A French machine tool expert also stayed at Dacca for a period of 12 months to train local fitters the technique of assembly and control of machine tools. The local workers are now capable of turning our machine tools from CKD parts in accordance with the standards laid down by Salmon and Schleisinger.

CO-OPERATION AND TECHNICAL ASSISTANCE NEEDED

It is necessary for the factory to acquire immediate technical know-how for the following machines to fulfill their programme of production: shaping machine; power press; bench lathes (8 inch or so, swing diameter).

It has been noted that the European countries are now finding it uneconomical to continue to produce mechanical shaping machines. It will be helpful if such a company is willing to hand over the design and manufacturing documents of all jigs and fixtures and if possible, patterns and coreboxes at a reasonable fee to the Bangladesh Machine Tool Factory.

The lathes for which licenses are at hand are a little sophisticated and costly compared to the local need. Most of the demand for lathes is for a small and simple lathe of swing diameter 8 to 10 inches. It may be difficulet to find

licenses for such a lathe from a reputed European manufacturer. In this repsect, assistance for a machine tool designer will be of great help. The designer will assist the local designers and draughtsmen in designing parts, jigs and fixtures and preparation of operation method sheets and production of prototypes.

In view of the country's limited experience in the filed of metalworking, it will need assistance of experienced personnel to organize the system of production and train local engineers and technicians of all levels in the discipline of machinery manufacture. In this connection, UNIDO may also be able to assist in providing experts for a period of two years or so in the following fields. The experts will be required to train their countorparts so that the local engineers and technicians are capable to take over from them at the time of their departure.

1 General Manager
1 Production Manager
1 Production Planning Manager
1 Design Manager
1 Quality Control Manager
2 Machining Foremen
2 Heat Treatment foremen
1 Cutting tool Foreman
2 Foundry foremen
1 Forging foreman
1 Jigs and Fixture manufacturing foreman
1 Assembly foreman
1 Training foreman
1 Die making expert
1 Pattern making expert

In order to exploit the technical know how already available, it will be necessary to manufacture a large quantity of jigs, fixtures, special tools patterns and coreboxes. A full fledged tool room with three Swiss made jig boring machines is now available. The factory urgently needs the services of two experts: one for the manufacture of jigs and fixtures, and the other for patter and coreboxes in order to assist the local personnel in manufacturing the above toolings from drawings and documents supplied by the licensors.

PART II

TECHNICAL ASPECTS

PROBLEMS IN THE DEVELOPMENT AND UTILIZATION OF MACHINE TOOLS

Design and Adaptation

Bangladesh faces a shortage of suitable manpower, capable of designing machinery, equipment and toolings. The Bangladesh Machine Tool Factory,, under the technical know-how agreement with the French licensors, has received design drawings and manufacturing documents for lathes, drills, and hacksaw machines. There is no need to make new design or modifications of component parts, but it is necessary to make modifications in the toolings in order to suit the local machinery. The progress in this matter is slow, due to the lack of personnel experience in this field. As has been mentioned earlier, there is a large demand for a small and simple lathe of 8-10 inch swing diameter, which is not covered by the licence agreement. Such a lathe could be designed and manufactured locally if assistance of an experienced designer is made available to guide the local engineers and draughtsmen.

Production and Prototype

The factory has not yet gone into full production. In 1970 it started assembling machine tools from imported CKD parts. The machining and heat treatment sections are not yet complete and as such machining of parts has not been started yet. However, it is expected that the factory will need the services of a few experienced foremen from abroad during the initial few years of production.

Organization of Production

The Bangladesh Machine Tool Factorynow employees 1,100 people and will employee 2,600 when it is completed. The factory, besides manufacturing machine tools, will also produce cutting tools, agricultural machinery, gearboxes, axles of buses and trucks, etc. In order to get the most out of the existing facilities, it is necessary to establish the forms of production and production planning. Such organizational methods have not yet been prepared, but it is thought to be of absolute necessity before it goes into production.

Quality Control and Testing

In 1970, an expert from the plants of the licensors stayed at the factory for 12 months. During his stay, he trained on the job a number of technicians and engineers on the discipline of machine tool control and testing. Since then, the factory is capable of doing these operations without assistance from outside. As for controlling the qualities of machined parts, not much difficulty is envisaged and it is planned to send a few engineers abroad for training in this field.

Underutilisation of its basic causes, ways and means for effective utilization

In Europe the machine tool manufacturers are involved only with machining, heat treatment of parts and assembly and subassembly of machine tools. It is also possible for them not to install machinery and equipment whose utilization is poor and t ey get the operation done by sub contracting to a specialized firm who specialises in such operations. In Bangladesh the metalworking activities have not grown and a machine tool factory with similiar facilities as a comparable European factory will not be able to function. The Bangladesh Machine Tool Factory has, therefore, to establish plants and equipment for all the metalworking operations which will be required for the manufacture of machine tools. It will creat facilities for quality castings, forged parts, surface treatment, elaborate tool rooms, etc. which are not usually found in European machine tool factories. For effective utilization of these facilities, it has become necessary to look for other production items. The proposed production programme for Bangladesh Machine Tool Factory, besides machine tools, also includes agricultural pumps, automotive gearboxes, and precision spare parts, casting and forgings for other industries, hand tools, cutting tools, etc. However, it will still require to identify other machinery items for more fuller utilisation of capacity.

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