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Regional Seminar on Machine Tools
in Developing Countries of
Europe, Middle East and North Africa

Slatni Pjassasi (Golden Sands) near
Varna, Bulgaria, 18 - 27 October 1971

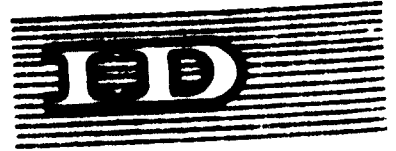
COUNTRY STUDY REPORT
ON
THE MACHINE TOOL INDUSTRY
IN
ISRAEL 1/

by

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Jerusalem

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28 September 1971

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Addendum 1

Page 6 Specification of Form I, para. F.

F. Others

- Sawing and cutting machines of all kinds (reciprocating, circular and band saws or abrasive disc operating cutters)
- Sheet metal and tube working machines (guilottes, power brake presses, roll bending, tube rolling, cutting, punching, shearing, blanking, etc.)
- Tapping machines, threading machines, planing and shaping machines, reaming and breaching machines, riveting machines.
- Spark erosion and electrochemical machining.
- Numerically controlled machines.

Part I. Policies and General Aspects

A well developed machine tool industry is a basic need for any industrialized country. The developing of machine tools contributes finally and to a great extent to the rising of the standard of life and the improvement of the balance of payment for the economy.

The effort invested to stabilize this industry leads to an important advance of the basic technology in general and of the professional skills of labour-force needed to overcome new problems challenging humanity.

But the labour-force is not only a factor of production. Its special position is due to the fact that it at the same time represents the real aim of all economic activity, namely, increasing consumption and satisfaction of most of the people who constitute both consumers & workers. In other words, the aim is to raise their income and their level, both materially and as regards their feelings and their satisfaction.

The State of Israel is a relatively small country of about 21,000 sq.kms. and a population nearing 3 million. Up to 1948 Israel's metal industry was negligible even if compared to the then not fully developed country's industry. 1955 marks the actual beginning of directed and accelerated development with increasing governmental assistance. At present the government assists an approved enterprise by a five years exemption from income tax; a 30% money grant for the cost of the machinery for the new factory (45% if the machines are purchased from local manufacturers) and a governmental loan up to 60% of the total investment in running capital and complementary expenses.

To get a status of an approved enterprise it is indispensable to have an export capacity, which has to be from 25 to 60% on its total output, according the plant's geographical situation. That's why the national aim is to encourage the export and to assure rational distribution of the country's population.

That policy will be continued in the next future while the assistance should be more directed and connected to aims and development plans. Besides the government formed a fund of 12 millions IL for research and developing the metal industry. A committee with a chief scientist at its head checks every project - an approved subject receives 50% government grant to carry on the research.

During the first decade of 1955/1965 industrial output grew threefold because industrial capacity was still limited and largely based on small firms. The few plants which could be said to operate on an industrial basis existed only in branches supplying current consumer goods and components for building or exploiting local wealth (minerals, agricultural products or manpower with specific skills).

During the second decade, from 1965 to 1975, industrial output was again planned to triple its size. However, its components will be different, the emphasis shifting to branches intended to increase exports or substitute imports, which are at the same time based on know-how and on the employment of highly skilled manpower.

In the 15 years period (1955-1970) the industrial output grew from 2.3 billion IL up to 12.1 billion, with the same amount of growth in the decade 55-65 as the five year period 65-70 - about 5 billion IL.

In 1955 industrial exports were still at their initial stages and amounted to only about 50 million dollars. Thus it was possible in the first decade to increase them six times, while in the second decade a growth of less than four times is expected. Also in this case it is apparent that total net industrial exports grew between 55-65 by the same amount as in the five years 65-70 - about 270 million dollars. In view of this past achievement, the increment of 600 million dollars planned for the next five years involving the doubling of exports to date to be a serious challenge.

Since the early 60's the period of protectionism of the local manufacture gradually came to an end. From then the import liberalization policy has included more and more products. To day almost all imports are liberalized and open to free worldwide competition, accompanied by a gradual reduction of customs duties.

The first period of administrative protection necessary for a rising economy, made it possible for the just born industry to consolidate and develop. The present policy of liberalization of imports has compelled manufacturers to rationalize their installations and production-processes in order to improve quality and reduce prices.

During the mentioned period the country succeeded in laying the foundations for a modern mechanical and electrical industry together with its technology, layout and skilled labour force.

Thus, Israel possesses to day a large number of factories producing agricultural machinery, earth movement devices, transport equipment, electric motors and transformers and electrical and electronic equipment. All this serves as a good basis to the development of a machine tool industry.

The first steps of a modern way of machine building in Israel started only at the end of the 50's. This is the principal reason why it not fully developed yet.

The following tables gives a condensed outlook of Israel's industrial development in the last 15 years and the foreseen for 1975.

Branches	<u>Output (in millions of IL)</u>				<u>Annual Average</u>		
	<u>1969 fixed prices</u>				<u>Growth Rates (%)</u>		
	1955	1965	1970	1975	1955-1965	1965-1970	1970-1975
Total Industry	2322	7265	12160	20150	12.1	10.8	10.6
Metal Industries and Electronics	365	1743	3530	7205	16.9	15.1	15.4
Machine Tool Industry	0.3	1.8	6.0	18.0	20.2	23.8	23.6
	<u>Number of employees</u> (1,000)						
Total Industry	127	220	280	352	5.6	4.9	4.7
Metal Industries and Electronics	32.2	69.0	95.5	135.3	8.0	6.7	7.2
Machine Tool Industry	0.03	0.07	0.150	0.360	8.5	15.3	20.0
	<u>Output per Employee</u> (1,000 IL)						
Total Industry	18.3	33.0	43.5	57.2	6.1	5.7	5.6
Metal Industries and Electronics	11.3	25.2	37.0	53.2	8.4	8.0	7.5
Machine Tool Industrie	10.0	25.6	40.0	50.0	9.2	9.1	5.5

1. Status of machine tools in the country. The next table reflects the existing stock, demand, production, import and export. All the figures referring to quantity must include in each case all the types, from the simplest and smallest up to the more advanced and large ones. The group of grinding machines includes, for instance, the portable or bench grinders, together with the more sophisticated universal-surface-cylindrical and centerless grinding machines.

STATUS OF MACHINE TOOLS

Machine Tools - Total figures

<u>Years</u>	<u>Number of Mach. Tools produced</u>	<u>Number of Mach. Tools imported</u>	<u>Number of Mach. Tools exported</u>	<u>Stock of Mach. Tools</u>	<u>Demand</u>
1960	350	3730	---	12200	4080
1970	2100	10000	700	45000	11400
1980	12700	25800	7500	185000	27900

A. Milling Machine Tools

1960	---	30	---	400	30
1970	---	150	---	1500	150
1980	200	800	100	5000	900

B. Drilling Machine Tools

1960	10	950	---	1800	560
1970	150	1450	---	3000	1600
1980	3000	7000	1500	15000	8500

C. Lathes

1960	---	150	---	6000	150
1970	150	700	---	12000	850
1980	1000	2500	500	35000	3000

D. Grinding Machine Tools

1960	---	800	---	1000	800
1970	500	2500	---	8000	3000
1980	3000	6000	2000	15000	7000

E. Presses

1960	40	200	---	1000	240
1970	300	200	100	2500	400
1980	1500	900	800	15000	1500

F. Others

1960	300	2000	---	2000	2300
1970	1000	5000	600	18000	5400
1980	7000	10000	3000	100000	14000

Selection by types through the evaluation of the production lines

In the country's different machine tool factories they are producing the following lines by its indicated types in the same Form 1 order.

Drilling Machine Tools

Bench and Pillar types with drilling capacity in steel from 12 up to 28mm partially on the basis of imported heads or gear cases.

Lathes

There is a unique lathes factory which established in 1965 on the basis of an know-how agreement with the English T.S.HARRISON & SONS Ltd. Company.

It produces two types of UNIVERSAL LATHES specially for vocational schools and light industry:

	<u>A</u>	<u>B</u>
Swing over bed	269 mm	305 mm
Aperts between centers	610 mm	610 or 1016 mm
Approx. nett weight	570 kg	700 or 775 kg

Grinding Machine Tools

Auxiliary tool grinders for sharpening hard metal tools and HSS.

Electric motor-grinders bench and base type.

Presses

Hydraulic frame presses for mechanical shops and maintenance work.

Eccentric presses are produced in several factories from 4 to 40 tons, in both inclinable and fixed types.

Since 1964 operates a large plant for eccentric presses from 22 tons up to 400 tons as a subsidiary of the American E.W. BLISS COMPANY, which supplies the know-how.

Others

Sheet Metal Working Machines.

With the cooperation of the Scottish Machine Tool Corp. of Glasgow starts to work in the year 1960 a large factory in the field of Sheet Metal machinery.

The main lines and their capacities are:

Guillotines from 1320mm up to 3050mm Cutting Length and from 3.2 to 6.3mm Mild Steel thickness capacity.

Power Brake Presses:

40 - 70 and 110 tons working pressure

2015 - 2515 and 3065 mm overall length of die.

Plate Bending Rolls:

1250 - 1500 - 2000 and 2500 mm length capacity and

4.3 - 3.0 2.5 and 1.5 mm max. plate thickness

Several smaller shops produce power saws (reciprocating); circular saws operating with abrasive discs or with toothless metal friction discs.

A group of work shops with 3 to 5 workers produce hand lever operated sheet rod cutting, bending, rolling, shearing, notching and punching machines.

Recently a science based enterprise developed successfully a Miniature E.D.M. Drill (Electro-Discharge Machining) for the micro-electronics (Integrated Circuits - IC). In developing state it finds an Electrolytic Grinder E.C.M. (Electro-Chemical Mach.) to complete the above Miniature Drill which started to be exported to Switzerland.

Machine Tools to be produced and to be imported

Following the government plan for the industry's development for the years 1970-1975, as a part of a larger plan for the whole decade, Israel will go on in its present line of machine production. In the same time will be gradually introduced new types with carefully selected specifications the best fitted to its prevailing technological, social and educational situation and its high man-power quality level.

This policy tends to introduce in production more sophisticated unites or its parts, specially on the middle size types.

It's obvious that for a long time we will still import the most specific and the latest developed machines, specially the heavy duty type. Among these it can be enumerated:

Turret Lathes - Single and Multi Automatics - Universal, Plain and Vertical
Milling Machines - Drilling Machines: Ultrasonic, Multispindle and Radial Arm -
Horizontal Boring Combine - Grinding Machines: Universal, Cylindrical, Surface
and Centerless - M.C. Machining Centers (Numerically Controlled) - E.D.M. and
E.C.M. (Spark Erosion and Electro-Chemical Machining).

Ancillary industries

Notwithstanding the smallness of the machine tool industrie we have made dynamic progress in the same short period in a number of ancillary manufactures.

Foundries. There are approximately 10 large and medium size Gray iron, Steel and Stainless steel foundries, besides of many small shops. They all supply the present needs of cast iron for machine building, improve its quality and output in order to meet the requirements of the permanently rising demand.

There is a very important plant that specialized in Malleable Cast Iron, Steel Foundry and Meehanite Foundry. It start in 1949.

Forgings. Another big plant specialized in hot Forging of all kind of parts.

Electrical equipment and components. There are several important producers of electric Motors to supply all the Machine Tool needs. From fractional power up to 750 HP. Some firms dedicates to produce electro-mechanical and electronic devices for machine control.

Tool industries. There are 10 important plants producing all kinds of tools: Turning and Boring Tools - Milling Cutters - Face and End Mills - Twist Drills - Saw Blades - Grinding Stones - Complete range of Diamond Tools like Diamond Grinding wheels, Diamond Boring and Turning Tools, Diamond Dressing Tools.

Some of the Cutting Tools are produced from HSS or Hard Metal tipped (including the powder sintering process).

Governmental policy related to machine tools.

There is no special policy for this branch. The same priorities, incentives, taxes, etc. for the whole Mechanical and Electrical industry are applied also for this case.

2. External technical assistance in the development of the machine tool industry

As mentioned above -page 5- we have some licenses and consultants agreement and one joint enterprise (Eliss-Israel). We look for bilateral assistance for develop new lines of machine tools with market facility.

3. Co-operation and technical assistance needed

The country is ready to receive and absorb new technical assistance, looking for every new way of developing modern fabrications. There is plenty of room and possibilities to absorb technical assistance from UNIDO such as surveys on priorities; types it would be convenient to produce; to propose an adequate foreign company for co-operation purpose.

Part II. Technical Aspects

1. Problems in the development and utilization of machine tools

The production is organized on modern technological basis notwithstanding we may feel the negative influence of the small production series.

The quality control and testing answer the most strictly requirements.

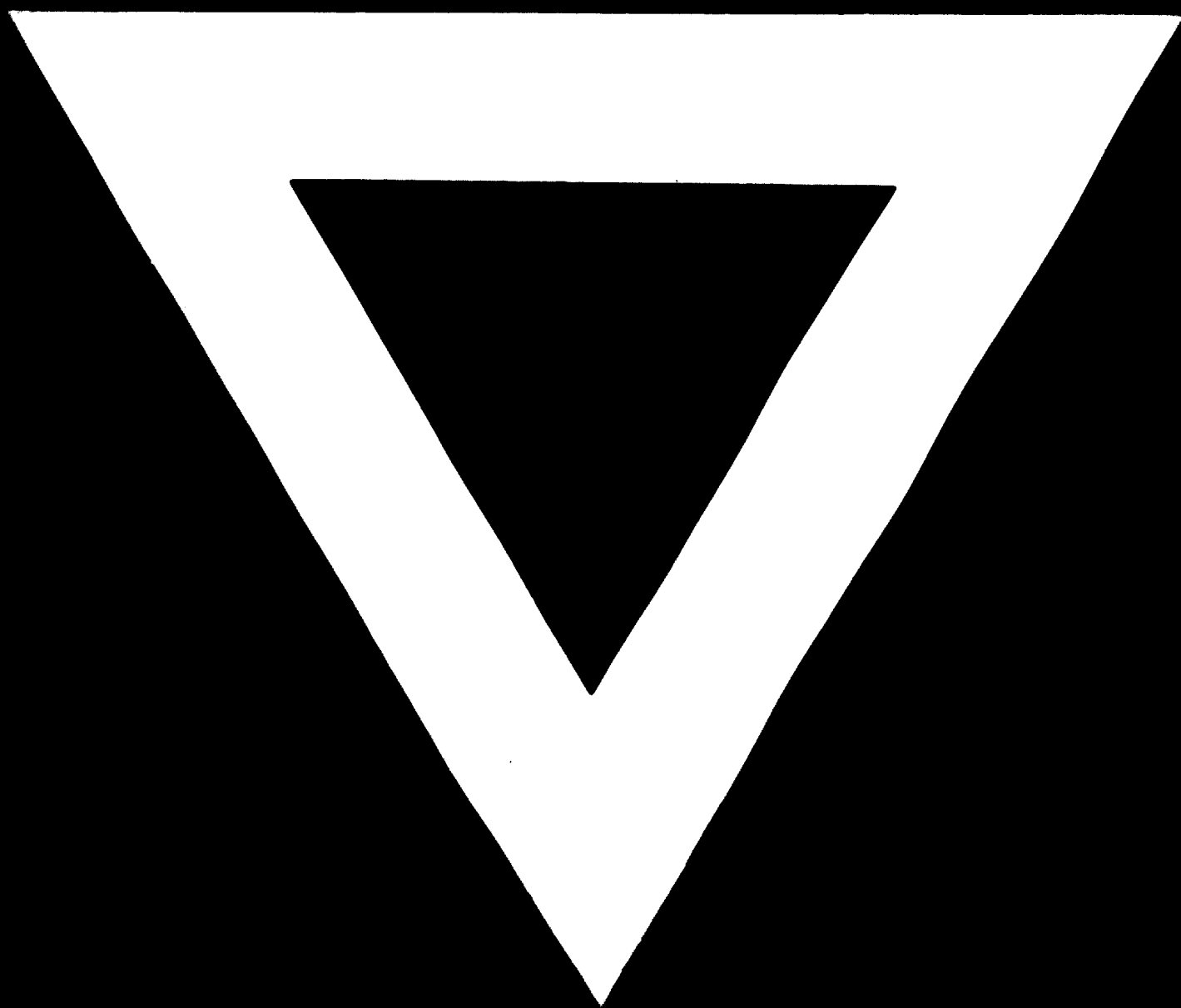
In the last years there's not at all underutilization in the lay-out, the machinery work full charge. The maintenance and repair works are done at constant rhythm.

There is a wide chain of vocational and training schools. Although we are in poor need of more trained people.

2. Consideration for introduction of numerically controlled machine tools

The first N.C. machines were introduced to the country since 1966, and from then there are now about 45 units in operation. We foresee a yearly grow from 10 to 15 units. These Machining Centres serves for the Aeronautical program and Security Industries.

There is already a good team of qualified technicians to run and care these very expensive equipments. New and following teams are being trained.



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