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ORGANIZATION AND OPERATION OF THE TOOLMAKERS INSTITUTE

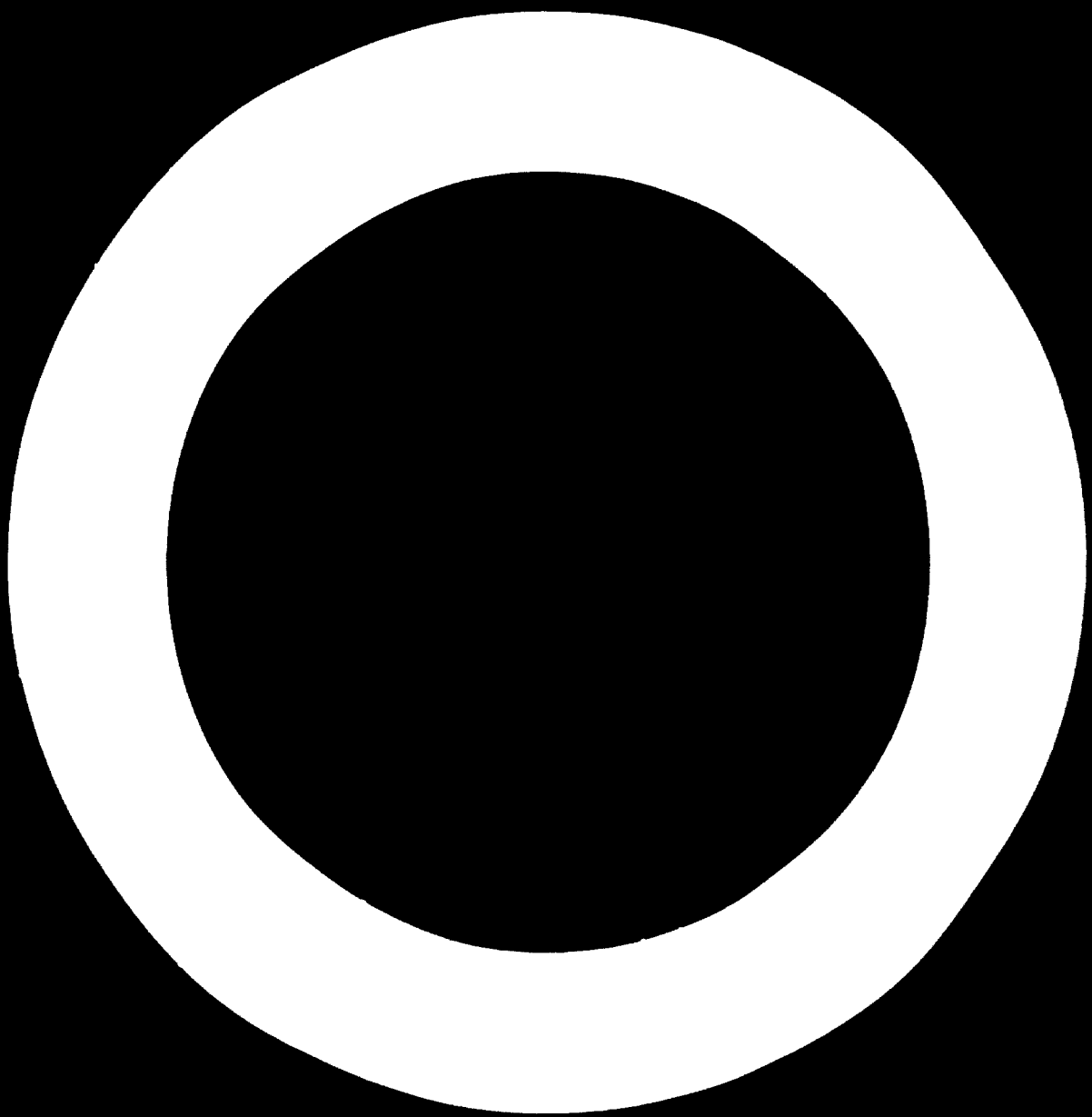
DP/JAM/72/006

JAMAICA

TERMINAL REPORT

Prepared for the Government of Jamaica by the
United Nations Industrial Development Organization,
executing agency for the
United Nations Development Programme

United Nations Industrial Development Organization



United Nations Development Programme

ORGANIZATION AND OPERATION OF THE TOOLMAKERS INSTITUTE

DP/JAM/72/006

JAMAICA

Project findings and recommendations

Prepared for the Government of Jamaica
by the United Nations Industrial Development Organization,
executing agency for the United Nations Development Programme

Based on the work of Derek A. Williams, chief technical adviser

United Nations Industrial Development Orgainzation
Vienna, 1975

Explanatory notes

A comma (,) is used to distinguish thousands and millions.

During the period of the project, the value of the Jamaican dollar ($J) in relation to the United States dollar ($US) was $US 1 = $J 0.91.

The following abbreviations are used in this report:

CAST	College of Arts, Science and Technology
JDB	Jamaican Development Bank
JIDC	Jamaica Industrial Development Corporation
NPA	National Planning Agency

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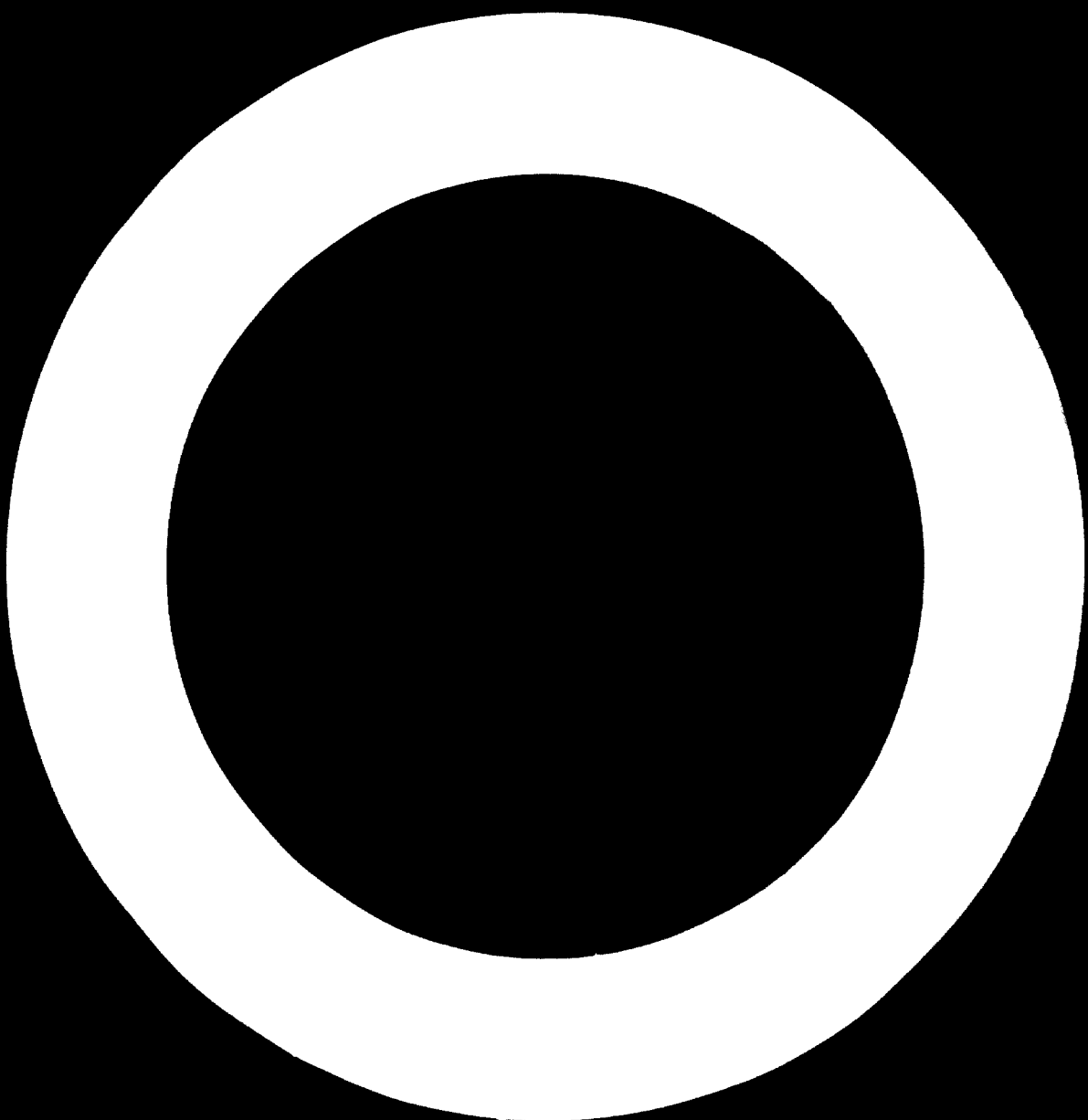
Annexes



INTRODUCTION

A. Background

The Toolmakers Institute was set up under the control of the Jamaica Industrial Development Corporation (JIDC) by the Government of Jamaica in 1971. Initial assistance to the project was provided by the United Nations Industrial Development Organization (UNIDO) under the Special Industrial Services Programme at the request of the Government in 1970-1971.

The project was included in the first United Nations Development Programme (UNDP) country programme of technical assistance for Jamaica and was approved in June 1972 by the UNDP Governing Council. An over-all provision of $US 175,000 under the indicative planning figure (IPF) for 1972-1974 was revised to $US 176,500 in accordance with a revised schedule and project document (completion date mid-September 1975).

The Government contribution of $J 647,200 was allotted to cover the two-year duration of the project. JIDC approved a budget of $J 202,000 for 1974-1975. The approved budget for 1973-1974 was $J 141,000, exclusive of building costs.

The project personnel were Derek A. Williams, chief technical adviser (10 September 1973 - 15 September 1975) and Conrad R. Wenstrom, design engineer (1 May 1974 - 29 October 1975). The project document was rescheduled owing to a delay in approving the recruitment of the chief technical adviser.

The building is a two-storey structure with an office floor of 2,300 ft^2 inclusive of classroom. A single-storey covered workshop of 7,000 ft^2 is adjacent to the repair and maintenance training and demonstration unit. The machinery is 90 per cent second-hand, rebuilt equipment purchased by JIDC and 10 per cent new equipment purchased with UNDP funds through UNIDO.

B. Objectives

The long-term objectives of the project were as follows:

(a) The industrialization of Jamaica as a means of making a higher contribution towards its gross domestic product (GDP);

(b) The development of wider employment opportunities;

(c) The achievement of more sophisticated skills within the industrial framework;

(d) The building of a technical infrastructure complementary to the needs of private industry;

(e) The creation of service facilities sufficiently diverse to effectively contribute to the industrial sector.

The short-term objectives of the project were as follows:

(a) Assist the management of the Toolmakers Institute to expand its programme of training for toolmakers and tool designers;

(b) Establish a service to industry in the manufacture, repair and maintenance of tools and dies;

(c) Provide technical advice to Jamaican industry on the proper use of tools and dies;

(d) Assist the Toolmakers Institute to increase its capacity to design and manufacture new tools for the specific use of Jamaican industry.

I. PROJECT ACTIVITIES AND ACHIEVEMENTS

A. General training

A three-year basic training course was introduced in October 1971 composed of classroom theory and workshop practice. The course is continually being improved to provide the required standard for fully trained craftsmen. The duration is expected to be extended to five years.

The estimated times of workshop exercises has been revised. A special training schedule was introduced in the final year of basic training to meet individual needs in various areas of operation that required strengthening.

The Institute employs 33 trainees. Nine trainees completed the three-year course in September 1974. Six of them were employed in private industry. The other three remained at the Institute for a fourth year of training and were employed as technicians.

Ten trainees were expected to graduate in September 1975 and to remain for further training. They will be employed to carry out jobbing work for private industry. In addition, 20 first-year trainees are at present receiving instruction at the Institute.

B. Management organisation and structure

Re-organisation of the management is being considered by JIDC to give better operational results and savings, with a more even distribution of responsibilities (see annex II). An incentive system on the basis of hours saved is being considered for incorporation with the new cost control system.

Production and scheduling boards, cost-control cards, a clock-card system and a stores-control system have been introduced. The workshop layout was re-planned and re-positioned to give better utilization of space and machinery.

C. Specialized training

The chief technical adviser initiated a programme of training in moulding tools in January 1974 that included workshop on-the-job instruction and a series of lectures. This programme is being continued by the design engineer. A further programme of training in pattern-making and model-making which was

not a part of the original work plan is to be incorporated into the project and will involve a separate area of training.

One fellowship provided for training in mould and die design for one man-month in the United Kingdom of Great Britain and Northern Ireland during August - September 1974.

D. Equipment

All machine tools ordered through UNIDO have been received. The total value of these tools and other equipment is almost $US 59,000. It has been suggested that some of this plant be transferred into the new advanced training/production unit when this is built.

The majority of cutting tools ordered through UNIDO have been received. The re-organization of the stores has been completed to provide adequate storage. The delivery of the equipment is being completed. This equipment is to be used for further training only. (See annex III.)

E. Service to industry

In the middle of 1972, the Institute began servicing some local industry by accepting simple jobbing work for a variety of companies thus giving the trainees some on-the-job experience. This work was on a limited basis until the latter part of 1973. Since this period, the work[1] from private industry has been increased to an annual turnover of $J 15,000-20,000 with the introduction of moulding tool construction.

All the work done for industry supports the Institute's overhead costs (see annex IV). It is hoped to increase this output at least tenfold if the proposed new toolroom becomes operational in the future.

1/ Further information about this activity is given on a audio-video tape made in Jamaica in 1975, "Toolmaking and industry".

II. RECOMMENDATIONS

A. Expansion and future development

Investigations carried out by the chief technical adviser and confirmed by the UNIDO senior industrial development field adviser, resulted in a proposal for major expansion of the Toolmakers Institute as a natural development and extension of the existing project.[2/] A market survey of tool-using industries justified the proposed advanced training/production unit. (See annex V.) Approval was given in principle by the JIDC Board and the Government in March 1975.

Phase I involves funds for technical assistance to enable a "bridging operation" to be carried out between September 1975 and December 1976 until the second country programme is operative in January 1977. The JIDC Project Implementation Division is attempting to finance the proposal on a commercial basis from the Government (capital growth fund) and commercial banks e.g., the Jamaica Development Bank (JDB), realising its importance in the future development of Jamaican industry.

Difficulties are being experienced in obtaining funds at acceptable interest rates to make the project commercially viable, bearing in mind the cost of expertise required for advancing training to the high level of skill required to construct tooling thus equating productive efficiency in terms of true cost.

JIDC is in the process of constructing the building for the unit.

B. Future development of training facilities

The chief technical adviser and the principal of the College of Arts, Science and Technology (CAST) met late in 1974 to explore the possibilities for greater use of the present educational facilities in Jamaica for better individual development of skills. The reaction was good to the following recommendations, particularly from the principal. It is felt further discussions should be convened in depth at a higher level in parallel with the following text.

CAST is the largest and most suitable training institution in Jamaica for technical and academic training in engineering and the sciences. It has well

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2/ Details of the proposal were given by K. Vyasalu, Proposal for Advanced Training Unit, issue II, revised 24 June 1974.

equipped workshops and other training facilities with well-established ties to internationally recognized examination bodies, i.e. City and Guilds of London Institute.

First-year full-time training (probationary period) could be introduced for basic toolmaking theory and practice, continuing on a day-release basis, or night school throughout the three- to four-year training period until qualification is reached. In the fourth to fifth year the assistance of training instructors could be made available for workshop and theoretical instruction from the Toolmakers Institute.

The second to fourth years should be spent in practical training on jobbing work for industry at the Toolmakers Institute. This period would cover training in tool design and construction under a semi-industrial environment. Graduation to the advanced training/production unit or metals Industrial Development Centre would take place between the fourth and fifth year.

Fellowships could be awarded to successful apprentices for training in middle management or technical specialization in the fifth year, i.e. a number of selected personnel spending 6-12 months in industry in Jamaica or abroad.

Research and development of imported and new products, product development, engineering value analysis and prototype production are some of the disciplines required to be introduced to "link up" with the Productivity Centre of JIDC in promoting quicker industrial growth. The possible creation of a Metal Industries Development Centre for this purpose can be envisaged. (See annex VI.)

The following measures should be carried out to enhance the development of future training facilities:

(a) High-level meetings should be convened between members of JIDC, the National Planning Agency (NPA), CAST, the Jamaica Manufacturers Association, the Ministry of Education, and the Ministry of Industry, Tourism and Foreign Trade to explore these areas immediately;

(b) Transfer to CAST should be arranged 1 year earlier than at present to enable completion of apprenticeship at 21 years of age as is the norm in Europe;

(c) Due to the above, present salary levels paid to the apprentices at the Toolmakers Institute would be more appreciated than at present;

(d) A greater number of apprentices could be more effectively trained and better selected for individual specialization.

III. CONCLUSION

The trainees at the Toolmakers Institute are reaching expected levels of skill, bearing in mind that the present course is only a basic, three-year course.

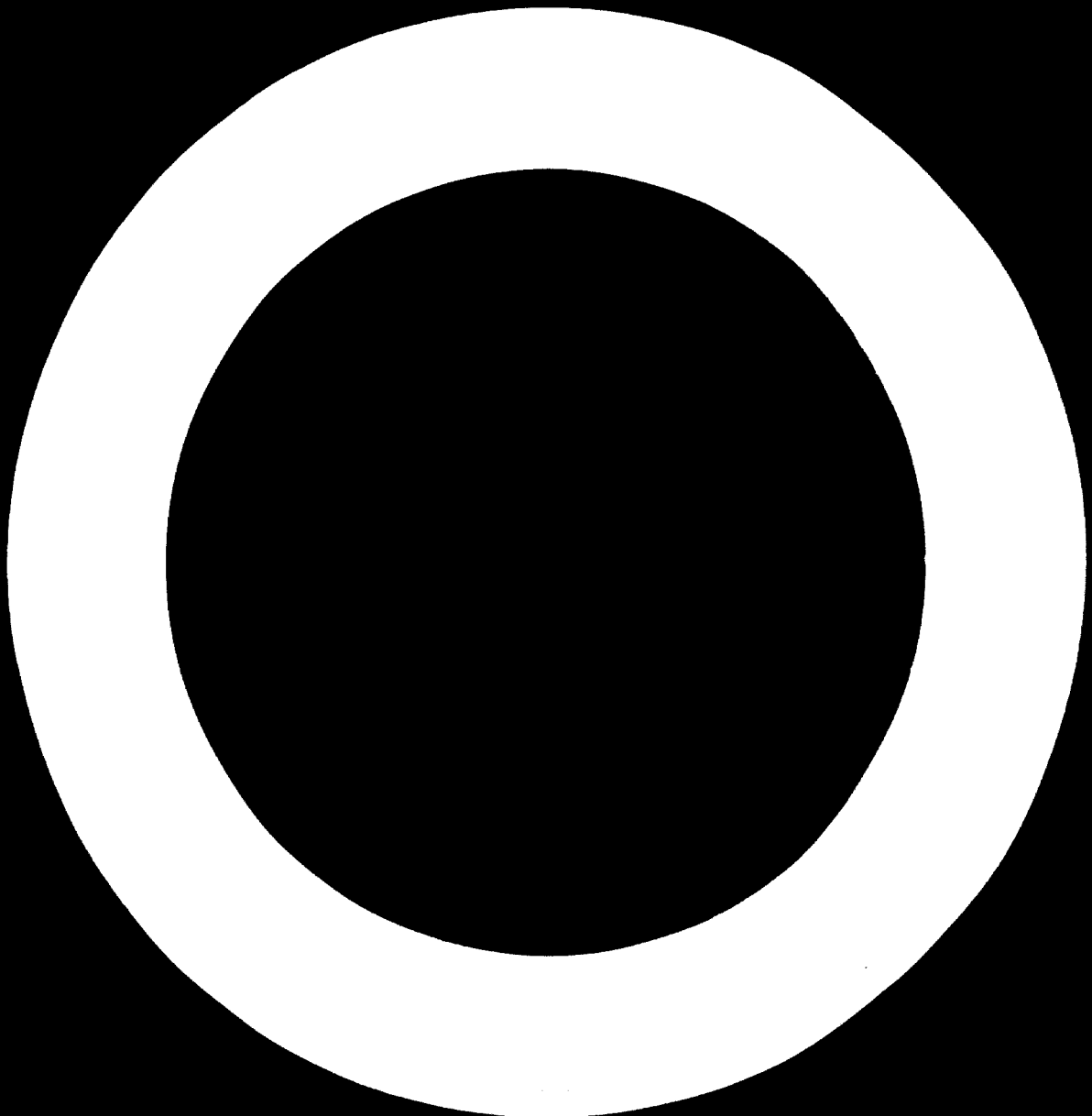
The assistance and service rendered by the Institute in constructing tooling and spare parts not available locally is well received by Jamaican industry. However, due to present limitations in trained manpower, equipment and expertise, the Institute cannot produce the total volume and satisfy the demand of local industry to maintain its present level of production and efficiency.

Present government planning and policy is being weighted towards further development of agriculture and agro-industry. However, if the Government plans to expand the industrial sector, the present production capability of Jamaica will be seriously hampered unless the appropriate action is taken.

An advanced training/production unit would provide a vital service to the growing needs of the industry and attract prospective domestic and overseas manufacturers by designing, constructing and repairing production tooling both in quantity and complexity, decreasing the ever present dependence on overseas suppliers.

The investment from abroad in new industries will be prohibited or delayed while such services are denied. This situation will lead to static industrial growth rate, greater imbalance in foreign exchange and lower gross national product (GNP).

Better progress could be envisaged if the management of the Toolmakers Institute is restructured. To resolve existing problems related to the finance and future development of the Toolmakers Institute, an economic and technical evaluation study should be carried out immediately by discussions at top government level between NPA/JIDC, the Ministry of Finance, and the Ministry of Industry, Tourism and Foreign Trade.



Annex I

PROJECT PERSONNEL

International staff

Derek A. Williams, Chief technical adviser	10 September 1973 - 10 September 1975
Conrad R. Wenstrom, Design engineer	1 May 1974 - 29 October 1975

Co-operating agency staff

Head of department

Director, Productivity Centre, J. Cecil Abrahams

Manager

James Lowe, JIDC	January 1972

Assistant manager/chief designer

Rupert DaCosta, JIDC	January 1972

Planning engineer

Edward Thomas, JIDC	January 1972

Workshop supervisor

D. Smalling	January 1972

Workshop training supervisor

Desmond Smith	January 1972

Lecturer

Errol Evans	March 1975

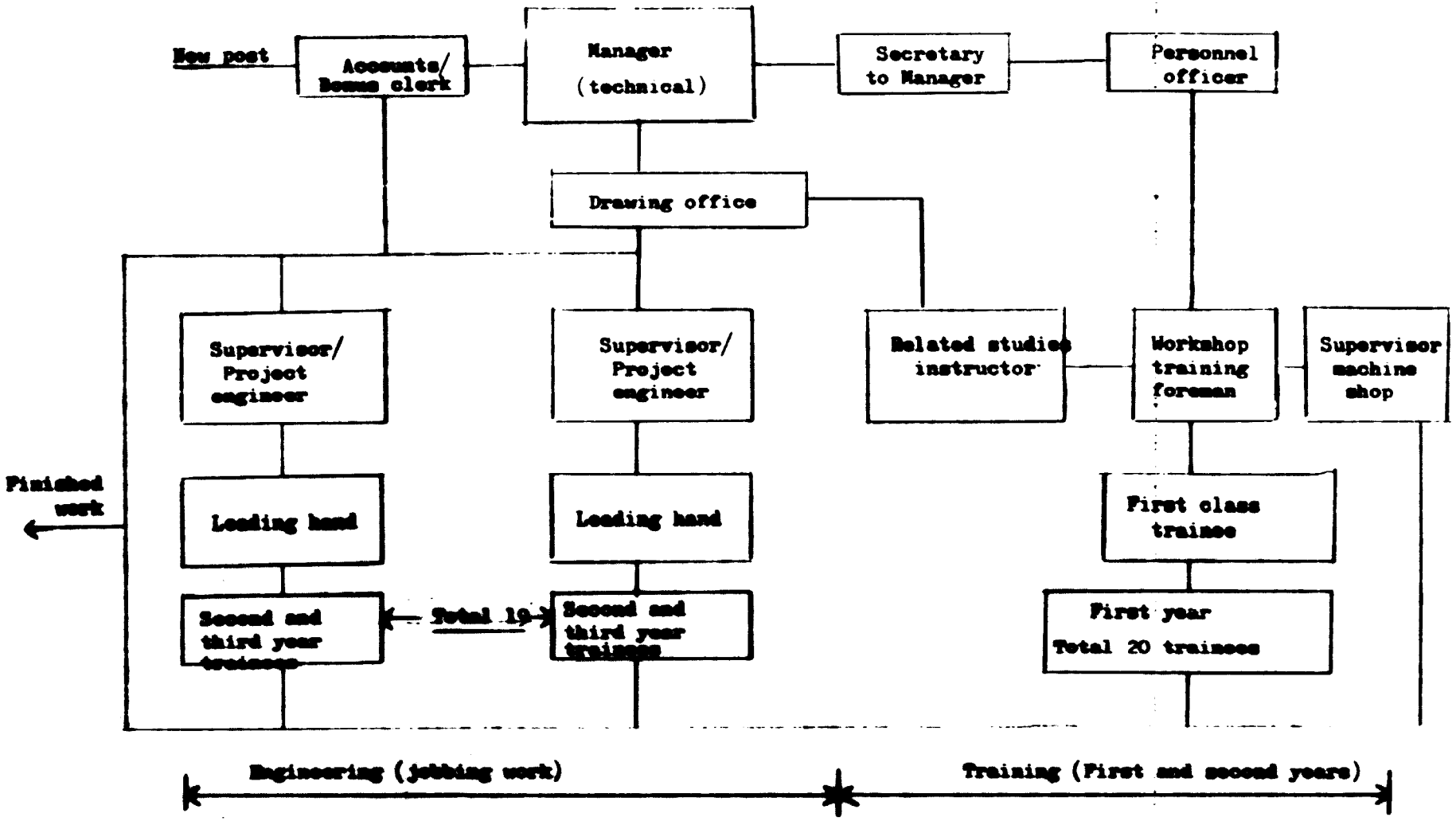
Secretary

Donna March	January 1972

All the above personnel were employed full time.

Annex II

PROPOSED MANAGEMENT PLAN FOR TOOLMAKERS INSTITUTE



Annex III

EQUIPMENT SUPPLIED BY UNIDO a/

Requisition number	Purchase number b/	Description	Quantity	Cost ($US)
73/1	15-4-00264A	Bridgeport mill (copy)	1	7,509
73/1	15-4-0026	Bridgeport mill (plain)	1	5,543
73/1	15-4-00040	Visual grinder 618	1	20,255
73/1	15-3-00563	Centre lathe	2	6,112
74/3	15-4-00687	Bridgeport mill (optical)	1	8,818
75/3	15-4-00040	Dust collector	1	809
73/2	on order	Books		995
74/1 and 2	15-4-00626	Small tools		6,316
74/1	15-5-00347	Small tools		950
74/4	on order	Books		97
75/1	on order	Books		388
75/2	on order	Books		532
75/4	on order	Periodicals		80
		Total		58,604

a/ All machines and equipment which are the property of UNIDO are to remain on their present site at Toolumbera Institute.

b/ All items stating purchase order number have been received (except 15-4-00040).

Annex IV

TOOLS AND MACHINE PARTS PRODUCED FOR JAMAICAN INDUSTRY, 1972-1974

1972

Customer	Item	Value (EC$)
Builders Metal	Steel bar	6.00
Builders Metal	Countersink punches	3.00
Caribbean Casting	Iron casting	15.00
Caribbean Casting	Gears	15.00
Building Industries	Punch block	90.00
Builders Metal	Plans copied	3.20
Caribbean Casting	Rental (furnace)	125.00
Davon	Bracket	3.00
Carib Sales	Punch	5.00
United Printers	Taper sleeves	40.00
Longlife Muffler	Consultant services	30.00
Caribbean Casting	Spindle	15.00
Wire Fabrics	Dies hardened	125.00
J.A. Macaroni	Crank swing fork	25.00
Carib Sales	Rotor guilds	39.00
United Printers	Steel bar	5.00
Electrical Manufacturers	Knockout repaired	150.00
Teletronics	Bronze gear	25.00
Standard Building Products	Round steel	6.00
Electrical Manufacturers	Dies and punches	8.00
Food Technology	One gear	25.00
Standard Building Products	Steel bar	24.00
Tropical Battery Limited	Steel bar	12.00
	Total	794.20

1973

C.M.P. Metal Products	Drawn steel	3.00
Stationery Manufacturers	Cropping die	15.00
Standard Building Products	Guillotine blades	20.00
Capella Lighting	Steel	60.00
Beal Industries	Cutting knife graded	5.00

Customer	Item	Value ($J)
Teletronics	One cross feed section	25.00
D. Mendes Ltd	Securing pins	45.00
Carreras of Ja. Ltd	Blades modified	60.00
Capella Lighting	Double bend form tool	130.00
N.C.C. Foods Ltd	Blades sharpened	30.00
N.C.C. Foods Ltd	Knife and blade sharpened	6.00
Booker B.D.H. Ltd	Plungers and sleeves	40.00
Relaxair Ltd	Plates grinded	5.00
Tropical Battery Ltd	Key way cut	5.00
Capella Lighting	Plates sharpened	90.00
Pillar Naco	Set gears	95.00
L.A. Brown Contractors	Adaptors threaded	20.00
Capella Lighting	Die punches re-sharpened	7.00
Lipton Jamaica Ltd	Shaft and pulley repaired	65.00
Esso Standard Oil	Pins and washer	28.00
Capella Lighting	Die punches grinded	18.00
Windows Ltd	Drawn steel	72.00
Daler Tooling and Manufacturing	Scrap metal	4.50
Daler Tooling and Manufacturing	Tool steel	3.50
Mayfair Furniture	Guild pin	6.00
C.M.P. Metal Products	Drawn steel	52.00
	Sub-total	910.00
Relamair Ltd	Blades sharpened	48.00
Plastec Ltd	Rebuild 6-inch HYD dylinder and make spare parts for piston	24.00
Plastec Ltd	Same as above	120.00
	Altering jig	15.00
	Total	1,117.00

1974

Customer	Item	Value ($J)
Daler Tooling and Manufacturing Ltd	Round tool steel	15.00
Worldwide Electric	Two cores	10.00
Worldwide Electric	Coil-winding core	5.00
Worldwide Electric	Coil-winding core	5.00
L.J. Williams	Shape die blocks	30.00
Relaxair Limited	Repair punch and die/ blade sharpened	52.00
Metform Limited	Tool steel	5.00
Daks Moulded Products Limited	Repair core box	80.00
Plastec Limited	Dishpan mould	125.00
L.J. Williams	Repair piercing die	40.00
West Indies Lighting		3.00
Jamaica Sewing Company	Piercing tool (sandal strap)	50.00
Caribbean Cement Company	Pin and shaft	10.00
Carib Metal Company	Gear and two racks	70.00
Longlife Muffler Limited	Tool steel	38.00
Aljoy Containers	Cropping tool	120.00
Daks Moulded Products Limited	Repair core box mould	25.00
Paper Processors Limited	Guillotine blades sharpened	30.00
Johnson and Johnson	Valve rectified	5.00
N.C.C. Foods Limited	Blades sharpened	18.00
Cispro Limited	14 tungsten knives	40.00
West Indies Glass	Repair and make new nozzle	60.00
West Indies Glass	Remake cut off brush Grind striker plate	25.00
Plastec Limited	Mould tool rectified	275.00
N.C.C. Foods Limited	Regrind cut off blade	40.00
Ceilings and Partitions	Half 'H' section in die remade	40.00
	Sub-total	1,216.00

1974

Customer	Item	Value ($J)
	C/fwd	1,216.00
Capella Lighting	Repair punch and die set	90.00
Worldwide Electric	Vee Bend and cropping tools	600.00
Aljoy Containers	Modification of form tool	395.00
West Indies Synthetics	Consultancy services	400.00
Ceilings and Partitions	New cross tee die	500.00
Modern Partitions	Main tee die repair	100.00
Cispro Limited	Resharpen H.S. cutter	50.00
Modern Partitions	New cross tee die	400.00
Things Jamaican	Spade drill	15.00
Plastech Limited	'U' pot mould ($J 3,000 material)	7,000.00
Plastech Limited	Comb mould	585.00
Plastech Limited	"Cover" reduce diameter	40.00
Plastech Limited	Square container modification	150.00
Frozen Foods Ltd	Fish cutter	150.00
	Total	11,691.00

Note: Other work completed later included two vacuum forming tools using cast-to-size technique valued at $J 2,300.

Annex V

MARKET SURVEY OF JAMAICAN TOOL USERS

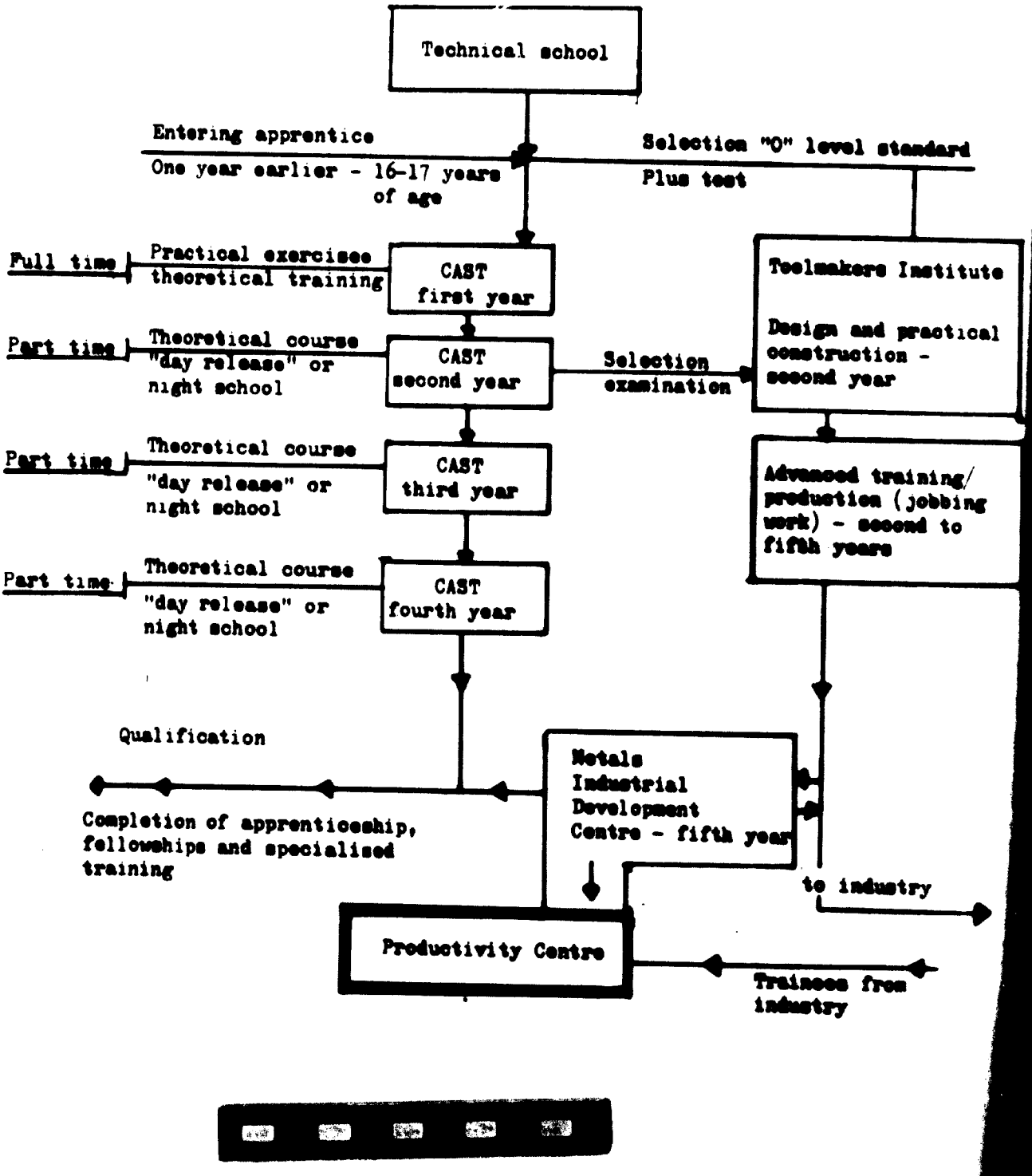
The survey solicited 83 tool-using companies in Jamaica. A positive response was received from 60 of these companies giving a diverse cross section of the industrial sector. This represents approximately 37 per cent of all possible tool and parts users. It can be estimated that a grand total of expenditure by industry on tooling would be in excess of $J 4.5 million per annum. Of this total expenditure in foreign exchange, it would be practical to produce 50 per cent of the total market locally should the necessary expertise and facilities be made available.

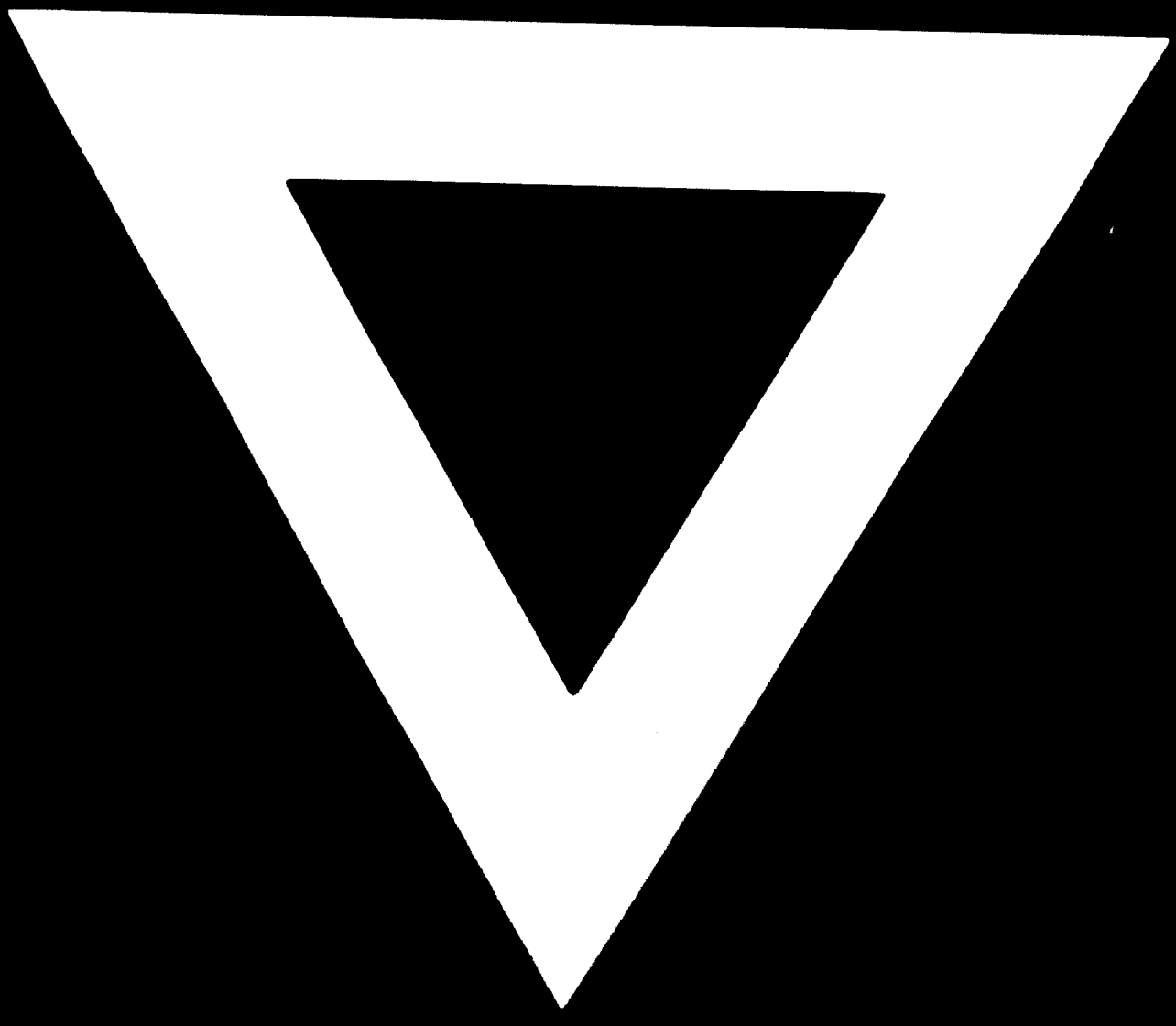
Company	Expenditure ($J) 1974	1975
Citrus Co. of JA	5,000	5,000
Liptons Tea	5,000	5,000
Paragon	2,000	6,000
Domestic Electric	500	3,000
C. M. Associates	4,000	7,000
C. Morins	3,000	3,000
Phillpps	500	10,000
Carib Sales	500	600
Graphic Arts	36,000	36,000
J. A. Milk Products	2,000	10,000
Long Life Muffler	500	2,000
Modern Partitions	700	1,300
Tru-Shade Awnings	18,500	33,000
JA. Record Mfg.	2,000	3,600
Lighthouse	3,000	3,000
Plastic Corp.	4,000	10,000
Wellco Shoe	2,000	4,000
JA. Macaroni	3,000	3,900
Arch. Alum.	4,000	3,400
Cispro Ltd	1,500	1,250
Naco Carib	10,000	15,000
Metform	2,000	3,500
Carib Toy Mfg.	19,500	31,000
Dacs Moulded	4,000	6,000

Company	Expenditure ($'000) 1974	1975
Ryans Mufflers	150	2,000
National Packaging	72,100	105,200
Penpal Pen Co.	8,000	20,000
Builders Alum	3,000	3,000
Clark and Clark	38,000	38,000
Deans Mfg.	5,000	2,500
CMP Envelopes	9,000	9,000
Containers Co.	5,000	13,000
Davon Corp.	18,180	24,000
Fashion Knits	1,000	1,000
KIW Group	250,000	250,000
Paper Processors	4,400	12,000
Plastech	400,000	700,000
W. I. Glass	160,000	170,000
Scientific Dist.	2,000	4,000
Stationery Mfg.	5,000	5,000
Talon Ind. Ltd	1,000	1,000
Titan Ind. Ltd	3,000	5,000
Alcan	1,000	1,000
General Ind.	1,000	500
Glew Adams Ltd	800	1,000
Golden Star Mfg.	500	2,000
Electric Arc	4,000	4,000
Windows Ltd	5,840	2,250
Jam. Frozen Foods	3,000	3,000
Tropicair	12,000	12,000
Kellys Ind.	40,000	40,000
W. I. Synthetics	70,000	370,000
Carib Pipe	30,000	30,000
Standard Building	60,000	60,000
Togar Plastics	5,000	8,000
Carib Metal Products	2,000	2,000
Atlantic Alum and Steel	50,000	50,000
Raymond Mahabir	1,400	4,800
Tropical Metal	8,000	15,000
Totals	1,412,570	2,176,400

Annex VI

PROPOSED TRAINING PROGRESSION PLAN





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