SRI LANKA

PROGRAMMES OF TECHNICAL AND TECHNICIAN EDUCATION

Engineering degree courses are run in two engineering colleges with an annual admission capacity of 350 students. A technicians' diploma course of three years' duration is at present run in the Ceylon College of Technology, Katubedde, within the campus of the University of Sri Lanka. Similarly, three-year diploma courses in engineering are run at the Hardy Senior Technical Institute, Anparai, which has excellent laboratory and workshop facilities. Technician education is treated as a part of university education.

The Directorate of Technical Education looks after technician training and education with the care it deserves. The Directorate has at its disposal the services of a full-time training officer who keeps in touch with the various training establishments spread far and wide in the country. There are facilities in Sri Lanka for the education and training of skilled workers.

TECHNICAL EDUCATION AND THE ECONOMY

A National Apprenticeship Board was established by the Government in 1971. It is responsible mainly for the organization of practical and industrial training for technical institutions of all denominations. Its address is 36 Wijerama Mawatha, Colombo 7.

The training centres run by the Government lack adequate facilities, with the result that training is not of the desired standard. In contrast, the training centre run in the private sector has well-developed facilities for all levels of technical education.

Technician courses are also run on a part-time basis for those who are employed. However, there is hardly any programme for training teachers for engineering colleges and polytechnics. Experts drawn from industry do the teaching work. Thus, industry acts as a responsible partner in education in that it extends full co-operation in the training of students and, to some extent, teachers as well.

Up-to-date projections of technical/skilled manpower have hardly been attempted, so there is no firm idea of the future needs of industry and related sectors of the economy. In fact, prospects of industrial development are bleak since the country depends excessively on imported raw materials to run its industries. There has been a sharp rise in prices throughout the world during the last few years, and imports are becoming costlier day by day.

Manpower requirements at the technician level are easily met from the country's own resources. Overseas facilities for the training of technicians are neither needed nor utilized. Instead they are needed for postgraduate studies and specialized technical training. Technician courses are so designed as to make

education and training flexible and broad-based so as to suit the changing pattern of industry. During discussions I was told there is less need for basic technician training than for specialized training in narrow specialities, and that, too, for a very small number.

What is puzzling is that there is a strong trade union of craftsmen which vehemently resists the recruitment of technicians in any industry. They fear that their chances of promotion would be bleak if technicians were posted to positions where craftsmen could work effectively if they had a little more experience. I am constrained to remark that this situation is bound to affect adversely all programmes for training technicians in a planned manner.

SUITABILITY OF TRAINING

The Government has established a National Council of Technical Education to co-ordinate training schemes with a view to avoiding duplication of effort and overlapping, and to ensuring better utilization of existing resources of the country. However, training is handicapped more in Sri Lanka than in other developing countries of the region because the unfavourable balance of trade has led to a dearth of equipment, spare parts, plant and machinery in technical institutions. Unless this situation is improved and the country's resources appropriately mobilized, the quality of training will deteriorate, particularly at this stage when vast developments are taking place.

It was emphasized that agriculture and agro-industry are most important, but petro-chemicals are becoming important, and rubber-based synthetic, chemical, textile, metal manufacturing and production industries need more specialist workers. These and allied industries need specialist manpower for their development. Specialist servicing and maintenance technicians are urgently required and will be required in greater numbers with higher-level technological knowledge, practical know-how and skill as industrial equipment and processes become more sophisticated.

INDUSTRY, TRAINING AND TECHNICAL INSTITUTIONS

Engineering first degree level courses are conducted at the Peradeniya Campus and at the Katubedde Campus of the University of Sri Lanka. At the former, facilities are available for specialization in the civil, mechanical and electrical engineering fields, while Katubedde allows further sub-division of the electrical engineering speciality into electrical power and electronics and telecommunications streams. The courses run in Katubedde Campus were made up, in 1972, of internal education for a period of four academic years in the university plus a training programme of one year in industry. This course is now being compressed into a course of four calendar years by rearranging the teaching schedule and utilizing the vacations for training.

The recognized technician courses conducted by the Hardy Senior Technical Institute at Anparai and the Katubedde Campus of the University of Sri Lanka lead to a National Diploma in Technology. The courses offer specialization in civil, mechanical (automobile), mechanical (production), chemical, electrical power, and electronics and telecommunication engineering. The course consists of a two-year internal teaching programme followed by industrial training for one year at suitable work places.

The curriculum of most of the engineering courses of Sri Lanka are based on the pattern of corresponding courses run in the U.K. and other advanced countries. It has not been sufficiently modified to suit local conditions or, after critical

examination of the requirements of local industry, to business, government and education. Tea, which is the biggest export product of the country, provides an example of this defect.

In recent times the major government and corporate sectors have involved themselves in the education of engineers, and industry has also shown lively interest in the planning of the course curriculum in technical education. Industrial in-plant training has been introduced to reduce the gap in practical knowledge of the end product of technical institutions.

Practical in-plant training of nine months is compulsory for engineering undergraduates of Katubedde, whereas Peradeniya students generally gain knowledge through vacation employment for varying periods. In the overall picture, theoretical and practical work occupy roughly equal proportions in the engineering curriculum.

MAJOR EXAMINATIONS

The holding of major examinations at the end of each academic year is still the most important method of testing engineering students in Sri Lanka. In the final year there is a "project report" on practice-orientated work. Course work is continuously assessed.

Entrance to engineering first degree courses is based on the results of the General Certificate of Education (Advanced Level) examination. For the National Diploma in Technology courses at the Katubedde Campus of the University of Sri Lanka and at the Hardy Senior Technical Institute, Anparai, entry is based on the results of the General Certificate of Education (Ordinary Level) examination.

Technician level courses in relevant fields are available as part-time/evening courses for those employed during the day. These courses are phased over three years of part-time study.

TECHNICAL TEACHER TRAINING

A wing for the training of technical teachers was started at the Junior Technical Institute, Ratmalana, in September, 1971. The first batch of technical teacher trainees underwent training in the fields of automotive mechanics, electrical trades and metal-work. This training wing has now been established as a Technical Teacher Training Institute, being permanently housed on the Katubedde Campus of the University of Sri Lanka. It has started training instructors for industry, in addition to its regular programme for training technical teachers.

PRACTICAL IN-PLANT TRAINING

Students for the National Diploma in Technology who have completed their two year institutional training are placed in various allied state departments, corporations and private sector establishments for a period of one year for in-plant training. They are under the direct control of the Technical Education Division for purposes of training placements, while training schedules and the payments of stipend etc. during training are controlled by the National Apprenticeship Board. During the in-plant training period they are considered as technician apprentices under the National Apprenticeship Board.

Special training schedules for in-plant training have been formulated as standards by the National Apprenticeship Board for the following areas of engineering and technology: (a) Mechanical Engineering - Production, Automobile;

(b) Electrical Engineering - Electronics and Telecommunications (Light Current); (c) Civil Engineering; and (d) Chemical Engineering.

By an enactment of the Legislature (National Apprenticeship Act No. 49 of 1971) the Government introduced appropriate measures for the regulation and systematic training of apprentices in the various trades. The total number of trainees for in-plant training (Engineering Technician) was 393 in the above fields of engineering in 1975. All examinations for technician courses are conducted by the Commissioner of Examinations on behalf of the Director-General of Education of Sri Lanka.

MANPOWER PLANNING

The responsibility for manpower assessment, forecasting and review rests with the Ministry of Planning and Economic Affairs. This Ministry is basically in charge of all planning activity including employment and manpower planning. There is a Division for Employment and Manpower Planning consisting of a Director, Deputy Director, two Assistant Directors, and other staff. It is advised by a senior I.L.O. adviser.

This Division works in close collaboration with the Ministry of Education, the universities, the National Apprenticeship Board and various other agencies engaged in training activities. Besides employment and manpower planning, this Division is involved in educational forecasting, and the co-ordination of education and training, relating it to manpower needs and examining all educational proposals. Thus it works very closely with educational problems and is particularly concerned with technical education and training.

The Division receives economic data from other units of the Ministry of Planning, while educational data are supplied by the Ministry of Education. Thus it has developed a proper framework for projecting manpower demands in respect of important categories. The manpower forecasts prepared and revised from time to time are passed on to the Ministry of Education in the normal course. There is a great deal of informal discussion, consultation and liaison process. Thus most of the manpower business is done in collaboration with the technical education authorities.

MANPOWER SUPPLY

Demands for various categories of skilled and high-level manpower for the implementation of Sri Lanka's development plans and programmes have been estimated, and are shown in Appendix 3, pages 101-103. These estimates denote only orders of magnitude and in this sense are indicative rather than definitive in nature.

Sri Lanka has now a fair degree of self-sufficiency in regard to engineering graduates in civil, mechanical and electrical engineering. Technicians, supervisory personnel and skilled workers are also available to meet current requirements. In the field of engineering, there are shortages of chemical engineers, production engineers and some specialized technical-cum-managerial personnel, but these are likely to be overcome with the return of a significant number of Sri Lankan engineers now studying abroad.

There are some areas of shortage, viz. experienced personnel in management, particularly technical management and consultancy for small industries, engineering personnel in highly specialized fields, and agricultural scientists with special experience. These shortages are presently being met through training arrangements and technical assistance.

The Department of Labour, Employment Division, occupational analysis unit has prepared occupational classifications and analysis used in Appendix 3, pages 101-103.

MAJOR INDUSTRIES

Sri Lanka's major industries are tea, rubber, and coconut growing and processing, but these are really a part of its agricultural sector. In the economy of the country, manufacturing plays a comparatively small role, but it is possible to distinguish three distinct sectors - the public sector, the organized private sector, and the unorganized private small-scale sector.

In the public sector there have been large investments in projects like the oil refinery, steel, tyres, hardware and cement. In the organized private sector the larger manufacturing firms are concerned with machinery and equipment. In the unorganized sector the major share goes to handlooms. The rough share of each sector in terms of value of output and employment is as follows:

SECTOR	VALUE (Million Rupees)	SHARE (%)	EMPLOYMENT
Public	310	8.4	18,700
Private	3,374	91.6	381,300
Organized	1,952	53.0	103,900
Unorganized	1,422	38.6	277,400

On the above, the comments to be made are:

1. Technical education and training facilities at the technician level are adequate to meet the needs of the nation in most fields.

2. Technical education and training has been given high priority in the National Development Plan. The Cabinet of Ministers has approved the setting up of a National Council of Technical Education and Training to co-ordinate all training schemes of the government departments, corporations and the private sector to avoid wasteful duplication and overlapping as well as to ensure better utilization of existing resources in the national interest. A list of industries who have offered training facilities is at Appendix 2, page 100.

FACILITIES FOR TECHNICIAN-LEVEL TRAINING IN ENGINEERING AND INDUSTRY

Institutions	Duration
Ceylon College of Technology, Katubedde Campus of Sri Lanka University	3 years Technician Course
Hardy Senior Technical Institute, Anparai	3 years
Irrigation Department Training Centre	1 year
Institute of Surveying and Mapping, Diyatalawa	1 year

PRACTICAL TRAINING

Both the technicians' and the engineering courses include a whole year of practical training in industry as this is considered helpful in producing better prepared

manpower for technical assignments. Also, and especially regarding the engineering students, it is generally recognized that intermission of practical work is beneficial to theoretical studies of engineers and technicians.

It was anticipated from the very beginning that there would be difficulties in implementing this new scheme of in-plant training in Sri Lanka. There was no tradition to build on, no legislation to support it, and a general absence of extensive or versatile industries to receive the trainees, except in the field of civil engineering. The National Apprentice Board is now taking an active interest in the problem . Although it has been possible to place all the students for practical training, it cannot yet be said that the trainees have enjoyed maximum benefits through this arrangement. This is partly due to the fact that students have been sent in over-large groups to the few industrial or technical establishments, almost exclusively government corporations or technical departments. They have often had to join training courses for apprentices of these institutions rather than being put to actual practical work.

The lack of adequate staff at the college level to plan, follow up and keep alive contact with the supervisors of the trainees at respective work places has also contributed to putting the scheme in jeopardy.

The practical training is nevertheless an essential ingredient of the courses at the College, and the difficulties encountered in the organization of a proper training have not discouraged the authorities; rather, they have encouraged them to improve the scheme. Employers of technicians and engineers who pass out from the College have expressed satisfaction with this part of their training. It is, therefore, hoped that the industrial sector as a whole will be more co-operative in the field of practical training of technical students as soon as they become aware of its advantages.

APPENDIX 1: OFFICIALS MET AND VISITS UNDERTAKEN

Officials

Mr. R. Paskaralingam	Senior Assistant Secretary, Ministry of Education, Colombo
Mr. T. O. P. Fernando	Director of Technical Education
Prof. K. K. Y. W. Perera	President, Katubedde Campus, University of Sri Lanka
Mr. B. A. S. Josephson	Chief Technical Adviser, UNESCO/UNDP, Katubedde Campus
Dr. P. Sivaprakashapillai	Ag. Head of Electrical and Telecommunications Department.
Mr. M. C. T. Fonseka	Training Officer, Directorate of Technical Education, Colombo
Mr. Wijemahne	Dy. Director General Planning
Mr. P. Ramanathan	Chairman and Director, National Apprentice Board
Mr. R. K. Srivastava	Sr. Adviser on Manpower Employment and Human Resources Planning Project, I.L.O.
Mr. D. Munnaweera	Design Engineer-cum-Training Officer, Tyre Corporation, Colombo
Mr. M. J. P. Senarathe	Ag. Registrar, Institute of Engineers, Colombo
Mr. S. Karunaratne	Dean of the Faculty of Engineering, University of Sri Lanka

Institutions and Factories Visited

College of Technology Campus of University of Sri Lanka; Sri Lanka Technical College, Colombo; Junior Technical Institute, Kegalle; Colombo Commercial Company, Colombo; Tyre Corporation (Government undertaking).

APPENDIX 2: ESTABLISHMENTS OFFERING ORIENTATION AND TRAINING FACILITIES FOR TECHNICIANS

Government Departments

Ceylon Government Railway Chief Mechanical Engineer's Dept
Ceylon Government Factory
Department of Buildings
Colombo Port Commission
Posts and Telecommunications Dept
Department of Civil Aviation
Overseas Telecommunications Service
Land Development Department
Ministry of Irrigation, Power and Highways
Water Works Department, Colombo Municipality
Department of Water Supply and Drainage

Government Corporations/Boards

Eastern Paper Mills Corporation
State Engineering Corporation
Sri Lanka Broadcasting Corporation
Mahaveli - Development Board
Ceylon Petroleum Corporation
Ceylon Steel Corporation
Ceylon Transport Board
Air Ceylon Ltd
Ceylon Oils and Fats Corporation
Ceylon Tyre Corporation
Ceylon Cement Corporation
Cement Electricity Board
Ceylon Ceramics Corporation
Paranthan Chemicals Corporation
Sri Lanka Sugar Coporation
National Textile Corporation
State Distilleries Corporation
Industrial Development Board
Ceylon Plywoods Corporation
State Rubber Manufacturing Corporation

Private Sector Establishments

Chemical Industries (Ceylon) Ltd
Lever Brothers (Ceylon) Ltd
Brown & Co, Ltd
Richard Pieris & Co, Ltd
J. B. Textile Industries Ltd
Lambretta (Ceylon) Ltd
Ceylon Oxygen Ltd
Moosagies Ltd
Deekay Electronic Industries Ltd
Union Carbide Ltd
Maharaja Organization Ltd
Walker & Sons Ltd
Ceylon Tobacco Ltd
Bata Shoe Co, of Ceylon Ltd
Colombo Commercial Co, Ltd

APPENDIX 3: MANPOWER UNIT STATISTICS

Estimated Demand for Technicians (Lower Grade), 1968-78

Category	Total Stock Required		
	1968	1972	1978
Building Overseers	280	400	620
Junior Inspectors	550	800	1,225
Junior Foremen	510	730	1,130
Junior Draughtsmen	590	850	1,300
Minor Supervisors	630	900	1,390
Overseers	1,610	2,310	3,550
Supervisors	570	810	1,240
Surveyors	880	1,265	1,940
Total	5,620	8,065	12,385

Estimated Demand for Technicians (Higher Grade) 1968-78

Category	Total Stock Required		
	1968	1972	1978
Clerks of Works	36	51	78
Senior Draughtsmen	1,066	1,532	2,353
Drawing Office Assistants	57	81	125
Foremen	618	888	1,363
Inspectors of Mines	5	8	12
Quantity Surveyors	9	13	20
Senior Inspectors	450	646	992
Technical Assistants	394	566	870
Total	2,635	3,785	5,813

Sri Lanka

Additional Employment by Occupational Groups, 1972-76

Category	Base Year (1971)	1972-76 (Additional Employment)	1976 (Projection)
Professional, Technical and Related Occupations	196,000	55,500	251,500
Administrative, Managerial and Related Occupations	56,700	22,600	79,300
Clerical, Sales and and Service Occupations	744,300	132,700	877,000
Craftsmen and Production Occupations	965,900	255,800	1,221,700
Farmers and Related Agricultural Occupations	1,973,100	343,400	2,316,500
Total	3,936,000	810,000	4,746,000

Demand and Supply of Skilled and High Level Manpower 1969-78

Category	Demand 1969-78	Supply 1969-78
Engineers	1,850	1,850
Architects	50	50
Technicians	9,950	9,000
Skilled Craftsmen	23,000	24,000
Doctors	2,280	2,050
Dentists	305	335
Nurses	4,520	4,520
Agriculture Graduates	585	585
Agriculture Technicians	1,200	1,200
Veterinary Surgeons	205	225
Science Graduates	9,900	4,250
Teachers	33,150	35,300

Demand for Engineers

Category	Total Stock Required		
	1968	1972	1978
Civil	760	970	1,255
Mechanical	300	460	800
Electrical	350	520	910
Marine	15	25	40
Chemical	40	70	150
Agricultural	20	60	110
Aeronautical	10	15	20
Refrigeration	40	60	20
Electronics	40	20	70
Industrial	10	25	40
Production	40	50	60
Other	40	50	60
Total	1,650	2,365	3,660