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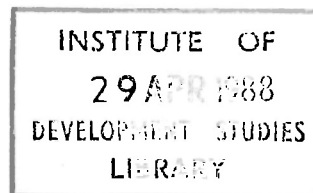
Formation of an Industrial Labour Force in Kenya

Experiences of Labour Training in the Metal
Manufacturing Industries

by

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Abbreviations

COTU	–	Central Organization of Trade Unions
DANIDA	–	Danish International Development Agency
DIT	–	Directorate of Industrial Training
ECA	–	Economic Commission for Africa
ECE	–	Economic Commission for Europe
EIU	–	Economic Intelligence Unit
EOI	–	Export Oriented Industrialization
FKE	–	Federation of Kenya Employers
GEMMI	–	General Engineering and Metal Manufacturing Industry
GoK	–	Government of Kenya
HIT	–	Harambee Institute of Technology
IDS	–	Institute for Development Studies
ILO	–	International Labour Office
ISI	–	Import Substitution Industrialization
ITC	–	Industrial Training Centre
KAM	–	Kenya Association of Manufacturers
KEWU	–	Kenya Engineering Workers' Union
KITS	–	Kenya Integrated Training System
MES	–	Modules of Employable Skills
NIC	–	Newly Industrializing Country
NITC	–	National Industrial Training Council
SIDA	–	Swedish International Development Agency
VP	–	Village Polytechnic
UNDP	–	United Nations Development Programme
UNIDO	–	United Nations Industrial Development Organization

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Chapter 1

Introduction

In the 1970s Kenya experienced a virtual boom in technical training initiatives. Reforms in public sector apprentice- and technician training programmes and the introduction of industrial education in secondary schools ran parallel to initiatives in the private sector. The out-of-school Village Polytechnic movement swept over the country and the Harambee Institutes of Technology were launched by the country's prominent politicians and notabilities. On top of the local initiatives, foreign donors entered the scene.

This was a shift in attention from academic to technical training and education, which raises a number of interesting questions about the causes and effects of the new interest. Certainly, the shift reflects not only a growing awareness of the need for human resource development but also changes in the labour market. – But how? – And how will the industrial training boom affect the labour market in the future? In the first place can one observe connections between training and labour relations? The study addresses these questions.

It was also in the 1970s, after the economic boom of the 1960s, Kenya started to feel the pinch of the global recession. Rising prices for energy and inputs from 1973–74 onwards reinforced problems that were already observable, such as the high costs of production and declining investments in industry. There was an incipient awareness in some circles that radical changes had to be launched to cope with serious issues such as the land-question and the future of agriculture and industry, in order to prevent the social tensions of un- and underemployment from exploding. In a single phrase the problems were expressed by the then Minister of Finance and Planning, Mwai Kibaki: “The era of easy options is over”.

But what were the options for the future and who was to decide and implement a strategy which would prevent the crisis from deepening?

This was the context in which the technical training boom of the 1970s was set. And it is in the context of a changing climate of industrial production this study has analysed the training policies and practices of the public and private sector.

Observations on industrial development trends

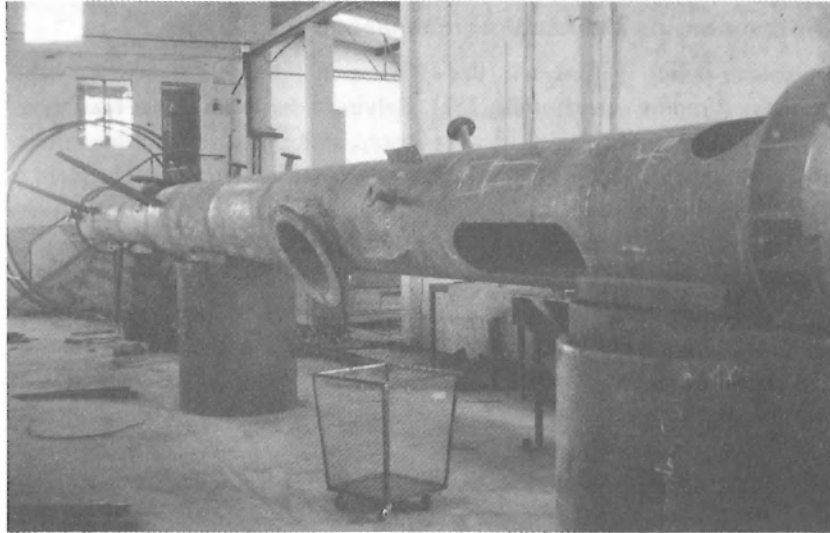
Industrial policy in Kenya in the 1960s to mid 1970s followed the basic pattern of import substitution (ISI). Relying heavily on direct foreign investment and protection of local industry, fuel, material and machinery imports have been high. The protection of local industry – in the form of special import bans and tariffs, low-interest state loans, duty-exemptions on intermediate inputs and machinery, etc. is connected with high costs in Kenya's manufacturing industry. The core of the pattern, as it has been seen by many analysts is the domination of multinational corporations, consumer goods industries with limited linkage effects and limited employment generation (e.g. R. Kaplinsky 1978).

There has been a substantial increase in the contribution of food, drink and tobacco, and metal products have continued to increase their weight since independence. A number of indicators show that import substitution has been carried far in a number of consumer goods industries, while capital goods are still basically being imported.

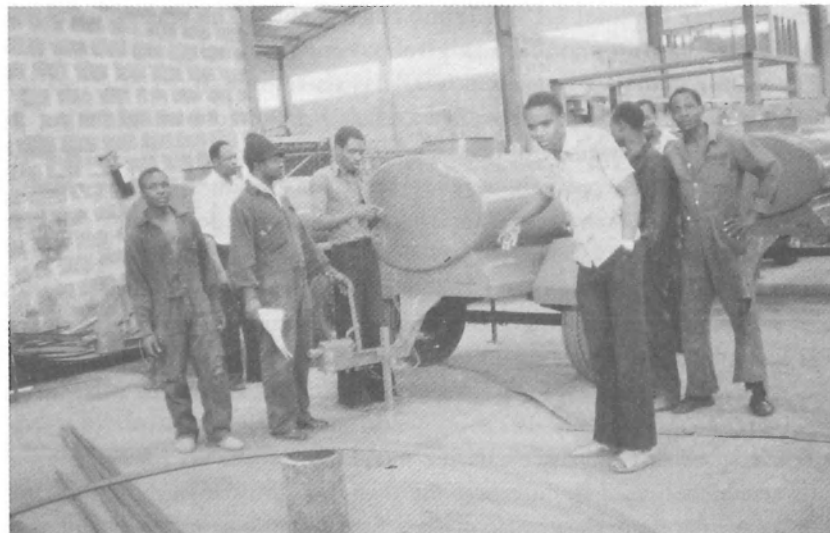
To summarize, Kenyan industry developed the following features during the protective import substitution phase: Manufacturing has been one of the economy's fastest growing sectors. Since Independence to the mid-1970s the annual average growth rate was 9.5 per cent compared to 6.0 per cent per year for total GDP. Manufacturing output increased 3½ times and employment in manufacturing rose about 2½ times.

The share of manufacturing in GDP has risen from 10 per cent in 1964 to 13 per cent in 1979. Between 1972 and 1977 manufacturing growth, still based on the "soft option" of protected import substitution, was at an annual rate of 10.5 per cent, about twice the rate of growth of the economy as a whole. Growth in the manufacturing sector slowed down with the volume of output rising 7.1 per cent in 1979 and only 4.6 per cent in 1980 after sharp rises of 15.9 per cent and 12.6 per cent in 1977 and 1978. Wage employment in the private manufacturing sector increased by 6 per cent in 1979, employment in this sector rising to about 112,000 in 1979. (M. Godfrey 1981). The proportion of value added declined from 28.6 per cent in 1963 to 22.4 per cent in 1975. By world standards the prices of goods manufactured in Kenya are extremely high.

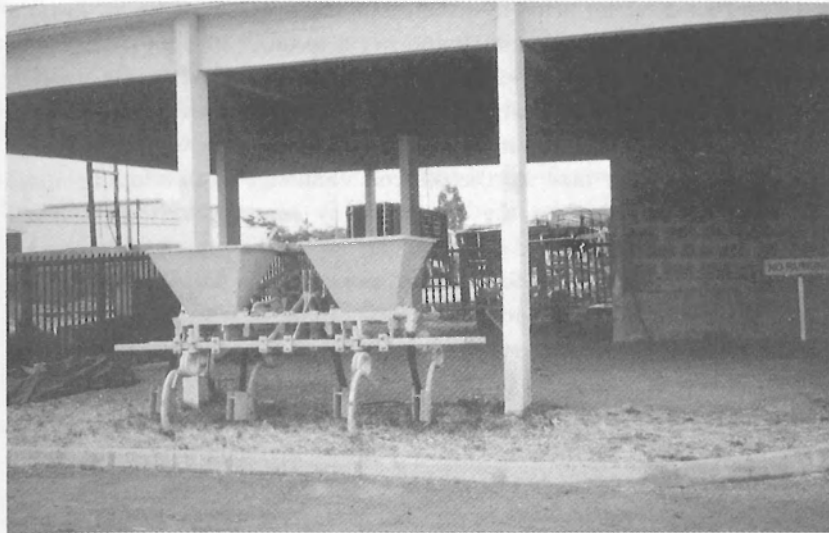
It would be wrong to interpret the moderate growth rate in 1979 and 1980 as a collapse in the growth of manufacturing following the exhaustion of easy opportunities. However, the drive towards a shift in industrial de-



Some specialization takes place in general engineering: (a) vessels.



(b) trailers.



(c) agricultural equipment.

velopment policy had already begun then. The rationale for a move towards a competitive export oriented strategy was set out in a number of plan documents (e.g. Sessional Paper No. 4, 1980). The drive for a shift did not so much come from the inside. In fact industrial and commercial interest groups objected while stronger forces like the World Bank pushed strongly to reduce protectionism in Kenyan industry. While the struggle goes on about the rate in which protectionist measures are to be phased out, the prospects of export manufacturing at the beginning of the 1980s are hampered by protectionist measures of industrialized countries, by a weak export basis from where to start (86 pct. of Kenyan export goes to other developing countries), and by a high cost structure in manufacturing.

There was little backing in the World Bank office itself or in the Kenyan Government for ideas developed in an extensive – but unpublished – World Bank study (1980) on potential linkage industries in Kenya. The report concludes that substantial progress in industry can only be made if Kenya begins to move into technically more advanced stages of engineering-oriented industry. The report suggested, this should begin at once, because it will require a long learning process to produce the necessary

skills, and for Kenyan firms to accumulate the necessary capital. From a long-term point of view Kenya should begin to move into technologically more demanding industrial fields. This would provide the base for structural changes which should enable Kenya to enter world markets for modern industrial products. The main focus in such a strategy should be the learning process. It must take up the difficult challenge of developing metal working industry which is the center of any complex industrial development (unpublished World Bank report, 1980). The report suggested a more sophisticated strategy for accomplishing heavier import substitution combined in the long run with export promotion. The strategy was never implemented. On the contrary, the overall situation at the beginning of the 1980s seems to reflect an ad hoc planning stage with no clear-cut analysis of alternative industrialization models, not to mention the necessary transition measures. The options entail a political struggle within the limits given by Kenya's dependence on the world economy and strong international forces. The struggle is ultimately a question of identifying and stimulating dynamic forces within the overall economic structure. The prospects for an economic recovery therefore have to be seen in connection with other economic sectors, the agricultural sector first of all. But this goes beyond the scope of this study. Within the industrial sector alone, the options concentrate on the protectionist ISI and the competitive export oriented industrialization EOI strategy. The major forces pull towards the competitive model.

If one were to fully analyse the dynamics of industrial development in Kenya, the significance of class forces would have to be examined. In the real world the direction of industrial development is determined by the struggle between classes over the allocation of revenues. The strategies may be outlined at the planning tables of government ministries, head offices of international banks and boards of directors, but the outcome is shaped by counteracting battles along the way.

Evidence from Kenya shows that the ability of Kenyan workers to act as a class force has varied significantly during the last 50 years. (J. Newsinger, 1981 and Makhan Singh, 1969 and 1980).

However central the position of the working class in the development process, this study has had a different emphasis, i.e. the analysis has focused on workers as a labour force rather than on workers as a class force. The choice of focus rests on the postulate that both ideologically, politically and organizationally the working class in Kenya is presently in a very

weak position. Thus Kenya's future industrial development path is only marginally influenced by any current strong demands from the working class. Rather, the options between extended heavy import substitution and export oriented industry – or the balance between them – are determined by competing capitalist interest groups – national and international in cooperation with the Kenyan state. What is significant in this respect, however, is the development of Kenya's labour force as a human resource. This is what the study has been about. It has emphasised the centrality of metal industries in the industrialization process, and the development of human resources in the metal trades is in focus.

The following sections present an overview of the position and weight of metal industry and the technological capacity vis-à-vis human resources in Kenya.

Metal industry in Kenya

Based on the structure of metalworking industries in about 25 developed market economies, UNIDO has calculated a typical structure of metal-

Table 1. The typical structure of metalworking industries in the developed countries, the actual structure in Kenya and the average structure in the developing countries (percentages).

ISIC. classification	Typical structure in developed countries	Kenya		Average structure in the developing countries
		1970	1974	
381 Manuf. of fabricated metal products, except machinery	22.8	30.0	29.8	46
382 Machinery except electrical	26.5	3.9	7.8	11.5
383 Electrical machinery appliances, supplies	20.0	24.6	19.1	17.5
384 Transport equipment	27.6	41.7	43.2	23
385 Scientific, measuring and other equipment	3.1	–	–	2
All metalworking industries	100	100	100	100
Percentage of metalworking industries in total manufacturing		25.9	18.2	

Source: from UNIDO, 1980, p. 13.

Table 2. Ranking of 13 developing countries regarding metal industry indicators (1973).

Country	Population (million)	GDP (mll. \$)	Per capita GDP (dollars)	Contribution of metalworking industries to GDP (percentage)	Employment in metalworking industries as % of population	Value added of metalworking industries per capita (dollars)
(1) Egypt	35.6	8,850	250	2.0	-	5.0
(2) Ethiopia	26.6	2,250	90	0.6	0.036	0.54
(3) Algeria	14.7	8,340	570	2.8	0.21	12.3
(4) United Republic of Tanzania	14.0	1,850	130	0.9	0.034	1.13
(5) Kenya	12.5	2,150	170	2.4	0.2	4.13
(6) Ghana	9.3	2,760	300
(7) Upper Volta	5.7	410	70	1.0	0.014	0.88
(8) Tunisia	5.5	2,571	470	1.3	0.5	6.12
(9) Mali	5.4	370	70	0.3	0.017	0.18
(10) Chad	3.9	320	80
(11) Benin	2.9	330	110	0.17	0.035	0.19
(12) Lesotho	1.2	120	100
(13) Gambia	0.5	60	120	...	0.003	...
Average:			220			3.9
For comparison with an industrialized country: Austria (1976)	7.5	40,633	5,400	7.0	2.33	449.0

Source: UNIDO country reports, UNIDO, 1980.

working industries, representing an average which may serve as a rough indicator of future development for Third World countries (this is not the same as a development target). In addition, the average structure has been calculated for about 96 developing countries.

In Table 1 the typical structure of developed countries and the average structure of developing countries are given together with the structure of metalworking industries in Kenya.

A comparison of the average structure in developing countries with the typical structure in developed countries shows that the share of simple fabricated metal products (381) is relatively high in developing countries, Kenya having a lower share in this category than what is typical for developing countries. The share of the product groups requiring a more sophisticated technology is lower in developing countries, but also in this comparison Kenya shows a more sophisticated structure than the average structure for developing countries, although machinery manufacture is still lagging behind.

Compared with a sample of other African countries Kenya falls in a group in which metal industry contributes more than 1 per cent to GDP (Kenya 2.4 per cent). The group of countries in question are Algeria, Egypt, Kenya and Tunisia (see Table 2).

The contribution of metalworking industries to GDP in Kenya has followed the trend of total manufacturing contribution to GDP. From 1973–

Table 3. Summary of main indicators of metalworking industries and of total manufacturing industries 1973 and 1977. Index 1973 = 100.

Indicator	Metal manufacturing		Index 1977	Total manufacturing		Index 1977
	1973	1977		1973	1977	
Establishments	2.797	3.047	109	12.582	13.681	109
Persons engaged	37.170	37.680	101	131.892	164.804	125
Labour costs £ '000	11.840	21.838	184	44.061	81.556	185
Gross product £ '000	20.203	41.248	204	101.412	228.583	225
Input £ '000	32.825	100.202	305	265.299	952.692	359
Output £ '000	53.028	141.460	267	366.711	1.181.275	322

Source: Based on *Report on Surveys of Industrial Production 1973–1976*, Table 30 and *Statistical Abstracts 1979*, Tables 125 and 129.

1974 the share of metalworking industries in GDP grew from 2.6 per cent to 2.9 per cent and fell again to 2.4 per cent in 1975 and 2.3 per cent in 1976.

Table 3. summarizes the main indicators of the metalworking industries compared to total manufacturing in Kenya.

The breakdown by size of establishments in the metal industry shows how the vast majority of firms are very small, employing 1-4 persons (small rural non-agricultural firms usually employ no more than 1-4 persons) (Table 4).

Table 4. Number of establishments in metalworking industries by size, 1973-1977.

Firms employing:	1973	1974	1975	1976	1977
50 or more persons	54	60	61	61	77
20 to 49 persons	50	76	56	53	
5 to 19 persons	144	221	227	260	
1 to 4 persons	50	68	81	104	
Small rural non-agricultural enterprises	2492	2577	2665	2745	

Source: Various tables in same sources as Table 3.

It is the vast number of firms in "transport equipment" such as small auto-mechanic shops that make the number of establishments in rural non-agricultural enterprises swell.

Despite the over-abundance of very small enterprises in the metalworking trades, Kenya still ranges among those African countries where metal industries have developed to a considerable extent. It is, however, difficult to identify a coherent policy to improve this sector. Some plan documents have highlighted the importance of intermediate- and capital goods industries. The 1979-83 Development Plan foresaw investments of approximately 50 million Kenya Pounds in metal industries and high growth rates in the sub-sectors. Manufacture of machinery alone was foreseen to grow at 16 per cent per year 1978-83. It is generally agreed that the target rates of growth were highly unrealistic.

The metal industries in Kenya are faced with a number of problems, central among them are the lack of local raw material, development capital

and the scarcity of management and technical skills. But first and foremost the potential contribution of metal industries is a question of incentives provided through industrial development policies.

Technological capacity and human resources

In the sense of having a highly qualified labour force with research and development capabilities, who can direct independent technological innovations, still only a handful of developing countries approach self-sufficiency. Kenya follows the pattern of indicators for technological capacity in Africa. Table 5, shows comparative global figures.

The devastating result of shortages of scientists and development engineers is that most research and development work is undertaken in the industrialized countries, in mother companies and research institutions and control of the process is lost, while the results of these activities have to be imported at high costs in the form of know-how, capital goods and intermediate inputs, knocked-down kits or turnkey projects, etc.

Figures from Kenya, 1975, show a number of 5.130 economically active scientists and engineers, and 5.879 technicians – i.e. a total of 11.009 (OAU/UNIDO 1980). Over 60 pct. of the engineers are employed in the

Table 5. Technological capacity, selected indicators^a.

Per 10,000 population	Developed market economy countries	Developing countries and territories		
		Africa	Asia	Latin America
<i>Science and technology</i>				
Ratio of total stock of scientists and engineers	112	5.8	22.0	69
Ratio of technicians	142.3	8.3	23.4	72.2
Scientists and engineers engaged in R and D	10.4	0.35	1.6	1.15
Technicians engaged in R and D	8.2	0.4	0.6	1.4

a. The size of the sample countries vary by indicator.

Source: UNIDO, *International flows of technology*. 1979 (vol. 3, UNIDO/IOD/326).

Central Government and parastatal sectors. Very few are employed by consultancies, which Bennel finds indicative of the overwhelming importation of foreign technology by enterprises. (P. Bennell, 1981).

If not strictly comparable, figures from 1970 show a total of 730 scientists and engineers engaged in Research and Development. Their field of R & D (Table 6) indicates that research geared more directly to manufacturing was very limited (11 per cent).

Table 6. Percentage distribution of R&D scientists and engineers, 1970, Kenya.

Natural sciences	Engineering	Medical sciences	Agriculture	Social science and humanities	Total No. of R&D scientists and engineers	
					No.	Pct.
13	11	10	57	9	730	100

Source: UNESCO, *National Social Science Policies in Africa*, Paris, 1974. (Social Policy Studies and Documentation).

It is more difficult to get a precise picture of the manual skilled labour resource in the country. A breakdown of wage employment in the manufacturing sector alone is set out in Table 7.

The categories are not very precise, however, and do not give a fair picture of the manpower situation. Thus, there were a total of 10,000 wage employees in manufacturing in the 6 skilled-worker categories that are relevant under the technical training programmes of the DIT, compared with a total of 30,300 in all economic sectors. That is, only about one third of skilled workers are employed in manufacturing.

Lack of comprehensive manpower data makes it difficult to assess whether there is a shortage of manual skilled labour, and to answer the question whether such a shortage may be retarding industrial development. The data from this study show that Africanization has been fully accomplished in manual jobs in metal manufacturing. At this level there is no dependence on expatriates, and former Asian craftsmen (not technicians, supervisors and engineers) are insignificant today.

The question should therefore be posed differently: Does the ability of workers at the present level of training retard industrial development and a

Table 7. Wage employment by occupation, citizenship and average monthly cash earnings in the manufacturing sector, 1977.

	Citizens		Non-citizens		Average monthly earnings K.Shs.
	Private	Public	Private	Public	
Unskilled workers	36,316	12,786	139	5	496
Bricklayers, masons, carpenters, painters	1,166	480	30	11	700
Operators of material handling, transport equipment, etc.	2,733	347	18	1	969
Plumbers, welders, pipe-fitters, etc.	349	495	27	11	920
Machinery fitters, motor mechanics, etc.	1,108	773	75	36	1,235
Electrical fitters, etc.	815	161	18	12	1,291
Machine tool operators, blacksmiths etc.	1,114	216	36	6	1,450
Technicians, foremen & supervisors	5,393	524	600	68	2,089
Architects, engineers & surveyors	144	33	154	143	6,242
Middle level executives	1,666	827	488	24	3,500
General managers & salaried directors	1,048	174	649	11	7,406

Source: Extracted from: Republic of Kenya, *Employment and Earnings in the Modern Sector 1977*. Central Bureau of Statistics, April 1979.

move towards other industrial development options in Kenya? It is a proposition that a more massive change to heavier industrial production will run into shortages of broad-skilled workers, increasingly so if narrow skill training of the Kenya Intergrated Training System (KITS) type is going to direct manpower development at the craftsman level.

Propositions

The propositions that have guided the delimitation of the study can be summarized as follows:

To solve its problems of high cost and inefficiency in industry, Kenya is faced with the choice between a more sophisticated import substitution strategy and production geared to export.

The import substitution of light consumer goods is basically saturated, while there may be scope for the substitution of capital goods and input production, termed heavy import substitution. The alternative is to follow the industrialization model of the more successful NICs and produce for the world market.

Both alternatives are supposed to have positive implications for the strained foreign capital reserves. Otherwise, the two strategies rest on different macro-economic policies – protection and competition respectively. Their manpower implications are basically different.

Generally, the heavier import substitution industries, of which many are in the metal trades, are skill intensive. Export oriented industries on the other hand – like textiles and food processing – tend to rest on a polarized work force, i.e. relatively more technicians and semi-skilled workers and less skilled craftsmen.

Thus, industrial branches are weighed differently in the two strategies, manpower structures vary and relevant industrial training policies differ accordingly. In the choice of industrialization strategy a number of factors are considered: Availability of investment capital, raw materials, location and infrastructure, markets etc. Central among these factors are technological capacity and manpower availability. Without ready access to appropriately qualified manpower or to adequate training facilities certain choices may be ruled out.

Three parties are concerned with industrial manpower development: the state, industry and the workers. The party primarily concerned with manpower development is industry itself. But the need of one company differs from that of another. As industrialization expands, the state therefore takes over more training functions on behalf of the multiplicity of companies. The workers themselves – the subjects in production and training – have a primary interest in the conditions of work and employment. Their level of remuneration is connected to their qualifications and skills. The ability of the workers to influence these conditions is determined by the

collective strength of the working class. But in situations of shortages of specific labour skills individual workers may be able to negotiate for better than average benefits.

Within this context the objective has been to highlight the question: How is Kenya preparing for future industrial development manpower-wise?

The main objectives however were to find out what characterized the workers and identify the carriers and the human resources needed for the transition.

Without relegating the importance of other variables, the study has focused on manual labour in industrial development.

The metal industry was selected, due to its centrality in capital goods manufacturing and its potentials for further industrial development along substitution lines were of particular concern.

The core of the study has been a survey of work and training conditions of manual workers in a sample of production and maintenance companies in the metal trades. In addition I have attempted to assess training policies and practices in this branch and to analyse the Government's training policies.

Concepts

Import Substitution Industry (ISI)/Export Oriented Industry (EOI)

The main trends in Kenya's industrial development are interpreted as a shift from a protective import substitution strategy towards a competitive, export oriented strategy. Certain production and labour characteristics are postulated to accompany the two models. A rough sketch is presented in Figure 1.

Figure 1. Production and labour characteristics associated with protective Import-Substitution Industrialization (ISI) and with competitive Export Oriented Industrialization (EOI) in developing countries

	ISI	EOI
Labour process	<ul style="list-style-type: none"> - Processing-, assembly-, and mechanical operations. - Technology: Hand tools, general 	<ul style="list-style-type: none"> - Sophisticated but adjusted processing- and assembly technology. Special purpose equip-

	<ul style="list-style-type: none"> purpose machines, special purpose equipment, some open loop automation. - Equipment often elderly - Productivity limited 	<ul style="list-style-type: none"> ment, open loop automation, some closed automation and computer controlled production. - Productivity high
Structure of the industrial labour force	<ul style="list-style-type: none"> - Relatively many broad-skill, universal craftsmen. Technicians in supervisory functions. On-going indigenization of engineering tasks 	<ul style="list-style-type: none"> - Large proportion limited skilled workers. Skilled worker and technician functions concentrate on control, adjustment and maintenance. Exclusion of major engineering tasks
Recruitment- and turn-over of labour	<ul style="list-style-type: none"> - From pool of casuals - Probation applied. Screening from practical rather than educational qualifications. - Low labour turn-over 	<ul style="list-style-type: none"> - High proportion young, female workers with some education and non-formal practical training - Male supervisors - High labour turn-over
Favoured skills and training of workers	<ul style="list-style-type: none"> - Practical experience - Mechanical and technical drawing comprehension - Long or short-term on-the-job training. Increasing state-participation in training and state-sponsorship of trainees - Private sector "poaching" 	<ul style="list-style-type: none"> - Dexterity, accuracy, speed, flexibility - Short-term on-the-job training - Formal training of technicians and supervisors
Labour control	<ul style="list-style-type: none"> - Industrial relations formalized - Labour-stabilizing devices to create worker-identification with work-place - Indirect control: Reserve army 	<ul style="list-style-type: none"> - Labour organizations disfavoured. Various punishment systems for errors. - Labour motivation devices - Indirect control built into dexterity requirements. High labour turn-over
Reproduction	<ul style="list-style-type: none"> - Tendency towards urban settled worker families but still many migrants. - Partial subsistence reproduction - Wage restrictions, but relatively high compared to other sectors. - Primary family responsibility 	<ul style="list-style-type: none"> - Tendency towards isolation of workers from community - Reproduction limited to wage income - Wage restrictions, piece-rate - Limited primary family responsibility.

Own chart

A further dichotomy lies in the concepts "light" and "heavy" import substitution industry. Light ISI describes non-durable consumption goods production, while heavy ISI is applied to the production of durable consumer goods, industrial inputs and capital goods. While import substitution industry is postulated to be more skill intensive than export oriented industry, heavy ISI is postulated to be the more skill intensive of the two import substitution strategies.

Metal industry/Engineering industry

It is widely recognized that metal industries play a vital role in the process of industrial development. Metal industries play a key role in economic development. They act as catalysts in both the material and social aspects of development. Metalworking industries perform a special function in inter-industry linkages as supplier of capital goods to all sectors and as a purchaser from other sectors and sub-contracting firms.

From a socio-economic viewpoint they are usually associated with technological innovation and a focus for cultural change. They contribute possibly more than any other industry to training labour in technical and management skills, to creating production and design capabilities and to improving organizational methods.

These views on the centrality of metal industries in development are expressed in a vast number of documents (for example UNIDO 1969 and 1980; ECE 1980). At a theoretical level the importance of basic industry and capital goods industry have been argued by scholars as different as C. Thomas, D. Senghaas and C. Palloix.

In the International Standard Industrial Classification (ISIC) the metalworking industries are broken down into major groups:

- 381 Manufacture of fabricated metal products, except machinery and equipment
- 382 Manufacture of machinery except electrical
- 383 Manufacture of electrical machinery, apparatus, appliances and supplies
- 384 Manufacture of transport equipment
- 385 Manufacture of professional and scientific, and measuring and controlling equipment, not elsewhere classified, and of photographic and optical goods.

Basic metal industries do not form part of the metalworking industries. The *engineering* industries constitute a sub-group of the metalworking industries covering mainly non-electrical machinery, electrical machinery and transport equipment.

In this study the concepts “metal industry” and “engineering industry” are used synonymously to denote companies engaged both in manufacturing, maintenance and repair. The companies included in the survey fall into the ISIC categories 381 and 382.

Although the metalworking industries turn out widely diverse products, there is a marked degree of communality in the processes, skills, raw materials and equipment used. This communality justifies the treatment of these industries as a sector.

Skill structure in metal industries

Metal industries have often acted as pace setters and guides in the development of new training patterns in both industrialized and developing countries. Excerpts from an ILO report describe the skill structure in the metal trades in developing countries in general in the following segments:



Highly skilled craftsmanship.



Using heavy machines of older make.

In the modern sector – in both large and medium-sized undertakings – workers, supervisors and other technical staff are normally able to carry out the same operations and functions and use the same equipment, materials and procedures as those employed in comparable work in industrialized countries. Products and procedures may have been designed in and directly transferred from industrialized countries. The recruitment levels for skilled workers and technicians are normally similar to those required by undertakings in industrialized countries. Apprenticeship and other initial training programmes run within these undertakings closely resemble those found in similar plants abroad. Their personnel structure, however, may differ; in most metal working plants in the developing countries the cadre of technicians is less well developed; in particular there are fewer research and development staff, designers, planners, production engineers and other technicians. For this reason staff mobility and opportunities for further training tend to be much more limited than in the industrialized countries.

The intermediate sector is mostly composed of small and medium sized firms, many of which have grown up spontaneously within the country concerned. The products may be copied from industrialized countries.



Production and maintenance of heavy equipment.

They are usually produced on older and less specialized machines, the work methods and organization have probably been developed empirically. Most of the plants in this sector are owner-operated, with a small number of intermediate technical staff and a few supervisors who have come up from the ranks of the workers. The skilled workers normally perform a wide range of operations and consequently need broad skills; they may have had formal training but many of them have just picked up their skills on the job. The majority of the employees are labourers and specialized workers with a narrow range of skills who have had little or no systematic training. Recruiting at a lower educational level is more common than in the modern sector.

The traditional sector – the artisans in manufacturing and servicing trades in urban areas, rural craftsmen, etc. – constitutes a third category. Emphasis is on manual work using chiefly hand tools and local materials. The working methods are traditional and frequently archaic. Many trainees enter the trade at an extremely early age and their training follows age-old artisan apprenticeship traditions. Recruitment is usually done on a personal acquaintance basis without regard to educational achievement level. Because of their generally low educational level the apprentices are

normally not accepted in classes for related theoretical instruction and consequently do not systematically learn any trade theory (ILO, 1970).

The sample firms in the study fall within the first two categories, i.e. "modern sector" and "intermediate sector" industries. Concerning skill-level in metal trades the study defines:

A *skilled* worker as someone who not only operates but also sets complicated machinery. Often a skilled worker needs a craft test certificate for his job. A *semi-skilled* worker is a person who operates a machine with more than one function, but does not set the machine. An *unskilled labourer* may be a machine operator who operates a machine with only one simple function.

Metal industries' operating techniques are generally classified into three subdivisions of trades related to machine tools, fitting and heat treatment of metals.

An occupational profile may be characterized as *broad skill* or *narrow skill*. Broad skill means that the worker masters a cross section of operations related to the particular trade, – turner, tool grinder, fitter, die maker, welder, blacksmith, sheet metalworker etc. Although the terms "broad skill", "narrow or limited skill" are relative concepts they are adopted in the study, since they are sufficiently precise to describe the craft apprentice skills with which the study is concerned.

Methodology

To approach the question of skill formation in the metal trades in the transition between import substitution and export oriented industrial development, the study has applied an analytical methodology focusing on three levels:

- 1) national level: trends of industrial development and industrial training,
- 2) branch level: training policies and practices regarding metal industry and
- 3) the worker: training experiences and labour relations of skilled and semi-skilled workers in metal industry.

The core of the study in the field was a survey in 5 metal working companies, while industrial development trends and training policies were supplemented by secondary source analysis.

Features of the labour resource in Kenya's metal industry were to be as-

sessed in a survey among skilled and semi-skilled workers. Six companies, representing a cross section of metal industries, were selected. The firms differed with regard to ownership and size – 2 are multinationals, 1 Kenyan owned, 1 owned by a local Asian resident, and 1 is a parastatal. Three were general engineering firms engaged in both manufacturing and maintenance, two were fabrication and maintenance workshops of a large parastatal and a large sugar-factory respectively. The sixth firm – a tin manufacturer – was selected for its unusual number of female employees. Unfortunately this company had to be left out, since research permission could not be obtained.

Through interviews with a representative number of workers from each company, – totalling 150 persons – information was collected during 1981 on their present conditions of work, their education and training experiences, job histories, labour relations and social situation. Production managers, and personnel or training managers, where these were to be found, provided information on the company and in particular on its labour relations and training policies. In four of the companies workers were organized in the industry's respective trade union, and shop-stewards were used as intermediaries for contact with workers.

The survey was the core of the project. But separate studies were undertaken of Industrial Development Trends, of Government Training Policies and of the Formation and Role of the Labour Movement based on an analysis of reports, files and documents, supplemented by interviews with officials and researchers in Kenya. Some findings of industrial development trends in Kenya are presented under Observations above. Concerning the role of the trade union movement, the interested reader may refer to the article "Fagbevægelse og samfundsudvikling i Kenya" (Labour Movement and Development in Kenya) co-author Per Kongstad, in *Den ny Verden*, 2/3, 1983.

In retrospect certain limitations of the chosen methodology stand out. From the outset I was aware that comprehensive manpower statistics were not available in Kenya. Data on stock, output or demand for manual engineering workers were not available. The study would contribute some data on a piecemeal basis from Ministry sources and from personal interviews. However, the sample companies were not composed to be representative of the whole metal industry sector in Kenya. They were selected to represent different types of manufacturing and maintenance companies (see above), and given the chosen methodology of comprehensive interviews with a re-

representative sample of workers in each company, the number of firms in the study had to be limited.

The chosen interview technique with standardized questionnaires with some open-ended questions, had the advantage of extending the possible number of interviews and of relying on research assistants. Regardless of how well the work is conducted, however, there are also limitations in carrying out interviews in preformulated swahili, or vernacular where necessary. There were clearly advantages in in-depth open interviews, which I undertook myself with a number of workers and some managers. The balance between quantitative and qualitative analytical methods may be particularly sensitive in cases where the topic, as it is here, is difficult to grasp in quantitative terms only and in cases where research personnel capacity is limited.

Chapter 2 is a critical examination of the dominant industrial training policy in Kenya. It is maintained that ongoing attempts to introduce the modular based Kenya Intergrated Training System will turn apprentice training into a narrow-skill operator training from the current broad skill training system, with unfortunate consequences for the individual workers and for further industrialization prospects.

Chapter 3 presents two company profiles in more detail, while cross company observations are included in the last section. Observations show a tendency towards a faint concern about labour training at the company level as recession looms. The victim is the worker, who has seen his situation deteriorate during the 1970s, with few options open to radically influence his situation.

Chapter 4 summarizes observations from the 5 companies and ties them in with discussions on national labour training policies and practices from the previous chapters.

Chapter 2

The structure of training for the industrial labour market in Kenya

Introduction

In the post-Independence era it was widely anticipated that the development of human resources, more than any other single factor, would be the panacea of development. International organizations, the World Bank, the ILO, aid donors, and national governments have invested large funds in education and training projects.

Kenya is a classic example of a society which after Independence has given priority to education. And in its efforts to reach universal primary education, and to develop higher education, Kenya has received extensive support from external donors. What could not be covered by governmental or external resources, has been accepted by the Kenyan people as a personal burden, for example building private Harambee schools.

When the education policy from the mid-1970s swung in favour of more technical and industrial education, the shift was again supported by the Kenyan people. They contributed huge amounts of money for example to the Harambee Institutes of Technology. And aid donors, including UK, USA, Canada, Scandinavia, Germany, Italy, Holland, Japan and UN organizations contributed funds, personnel, equipment – and each their own training philosophies. Denmark alone contributed about 25 mio. D.Kr. to technical education in Kenya 1981–83, and scores of Danish instructors and teachers have been employed in the technical schools.

In this situation it is understandable that a desire has arisen in Kenya to control and coordinate the many inputs and, in the future perspective to command the philosophies and policies that guide industrial training. To approach this stage Kenya has adopted the current ILO philosophy of industrial training.

In an international perspective the International Labour Organization is the main proponent of developing new training philosophies. Currently the ILO propagates the Modules of Employable Skills (MES) philosophy. It is a system which proclaims to have global applicability through its supposedly high degree of national adjustability. Basically it is a methodology

for bringing about a close correspondence between production requirements and labour skills, mediated by technically sophisticated teaching material for institutional and on-the-job training based on taylorist principles. All training which goes beyond the need for specific production operations is considered a waste to be avoided. It is a narrow job-oriented training approach.

A sociological perspective, on the other hand, is concerned about the interests involved in industrial training – those of the workers, of the employers and of the state. It is also concerned about the relationship between production structures and labour qualifications but in particular concerned about the causes of change over time. In this study paramount importance is given to the consequences of training policies and practices as it focuses on the breadth and flexibility of workers' qualifications on the one hand and on the relationship to future industrial development on the other. After an introduction to tripartite regulation of industrial training in Kenya – exemplified by central issues in the steering of metal-works training – this chapter attempts to give a critical assessment of Kenya's adoption of the MES-based Kenya Intergrated Training System. The narrow job-orientation of KITS will reduce the workers' already-limited chances of job mobility. It is argued that the system is based on erroneous assumptions about Kenya's industrial development trends, and therefore proposes that the training system should include a need based perspective and not only demand considerations.

Production processes, skill requirements and training approaches – some conceptual considerations

Neo-classical labour market models assume that the structuring of the labour market and balancing between partial labour markets takes place through labour mobility and is effected primarily through the supply-demand mechanism by wage- and income differentials and -changes. (See for example M. O. Todaro, 1976).

As a reaction to neo-classical labour market theories approaches have been developed which attempt to go beyond the sphere of circulation. Attempts – if sometimes only fragmentary – to identify production related causes for the trends and structuring of the labour market have been developed within the framework of the *dual labour market* theories (for example: W. A. Lewis, 1954; Manchester School 1979; M. J. Piore, 1973 and 1975)

and in the more recent theories of *segmented labour markets* (for example: M. Reich et al., 1980).

Other theories, that departed from labour and education were developed during the 1960s to explain the specific problem of labour reproduction: unemployment. For example the *human capital theory* (G. Becker, 1964) based on a model of cost-benefit considerations about investments in education by the individual and the employer, has influenced labour market theories. During the late 1960s and 1970s new approaches to understanding "human capital" as something determined quite differently than by the "rational" individual's planning of skill-acquisition, appeared in the area between labour market studies and studies of the political economy of education. In the works of the so-called Berlin-school (E. Altvater, 1975; E. Altvater and F. Huisken, 1971; D. Otten, 1973) the sphere of labour qualifications and training was coupled to the sphere of capital development. In Läßle's (1973) work, labour qualifications were explained as necessary conditions of production which the state would have to provide for capital, and likewise Altvater developed theories of state intervention in the capital/labour paradigm. What was new in these approaches and could explain concrete state interventions in the labour market, in the educational and social security fields, was their coupling of material production, the labour process and labour reproduction.

In this study industrial production processes and the formation of the labour force according to skill combinations, are seen as closely interlinked and mutually determining. Today's industrial training practices structure the labour force that will carry future industrial production.

The concepts used in this study are often simple dichotomies: (i) protective/competitive import-substitution industry (ii) broad-skills/limited skills (iii) on-the-job training/institutional training (iv) private participation/public participation. These concepts may seem too simplistic to grasp complex realities. However, the idea of the study is to trace trends – trends of industrial development and trends of industrial training policies and practices. And in the process to discuss their interrelationship and to unveil the (contradictory) interests of the parties involved, i.e. the state, the employers and the workers. It is believed that this justifies the application of the chosen concepts, the definition of which should appear from the context in which they are used.

The organization of industrial production in many of Kenya's larger enterprises is based on production processes that employ the processing or

assembly type (e.g. manufacture of tins and car assembly). In such production departments, technology and the organization of work tend to have little impact on skill development. The majority of workers either do highly divided manual part-work or operate special purpose equipment, which are both of *repetitive* nature. This kind of industrial work actually *underdevelops skills* and requires very little general education and technical training. *Training on-the-job* of very short duration is generally considered sufficient for the large group of semi-skilled craftsmen. (P. v. Mitschke-Collande, 1979).

These taylorist characteristics, which tend "to widen the gap at the heart of the work collective between conception and performance, technical and unskilled labour", take another direction in metal processing. Characteristic for the *metal working industry* is that even the most modern and up-to-date production process requires the presence of skilled workers – above all, in such key areas as the manufacture of equipment goods and machine tools. They actually require a great deal more than the theoretically necessary, and socially required, level of involvement and skill (A. Lipietz, 1982).

With regard to skill and training requirements in capital goods production and maintenance work, Mitschke-Collande observes that "the *capital goods department*, but also *central workshops* of light industries, tend to correlate more with manufacture of sophisticated products, with small or medium-scale output. There is little segmentation of the work process. The majority of operators have to perform a variety of complex operations with hand tools, different machine tools, and measuring instruments. These tasks are skill and labour-intensive and at the same time *require formally trained and practically experienced craftsmen*. Commonly, training of semi-skilled workers is left to the responsibility of the enterprises concerned. But, fairly detailed planning at the national level is necessary for highly skilled craftsmen who require formal training". (P. v. Mitschke-Collande, 1979, emphasis added).

It is not an easy task to estimate the proportion of training in public institutions as opposed to training on-the-job. While public institution training is registered, on-the-job training tends to be registered only in so far as workers come forward to have their skills tested for the purpose of acquiring Trade Test Certificates. Or, on-the-job training is registered as long as it is a part of public training programmes. But by and large, on-the-job training, whether arranged along systematic training principles or given in

an incidental form, remains unregistered. It is therefore also impossible to give any precise estimations of the comparative quantities and qualities of public institution training and on-the-job training.

Behind this dichotomy of public institution training/on-the-job training lie some assumptions about "normal" mechanisms in the process of industrial development. In all industrialized societies there has been a tendency for the state to take over responsibility for the physical and social infrastructure, e.g. labour training, once the interests of single firms and the collective of firms no longer harmonize – when the capital outlays for infrastructural facilities grow beyond the capacity of individual firms.

The situation in Kenya seems to be that this transfer of responsibility for training from the individual firm to the public sector is at an early stage. The institutional framework for this transfer has been developed with the establishment of agencies like the National Industrial Training Council (NITC) and the Directorate of Industrial Training (DIT). The following section gives a flavour of the intricacies involved in establishing consensus over a division of responsibility for training between the public and the private sector.

Tripartite regulation of training for the industrial labour market

Directorate of Industrial Training (DIT)

The Directorate of Industrial Training is at the core of industrial training in Kenya with the largest number of craft and technician trainees passing through its system.

It is the responsibility of the DIT to provide training possibilities for private and public industries who want external training of craftsmen, technicians and indentured learners. The DIT is a department of the Ministry of Labour. It is answerable to a tripartite body, the National Industrial Training Council (NITC), in which Government, employers and employees are represented.

The NITC is assisted by advisory sub-committees which take the responsibility for formulating training policies for individual trades. These committees were particularly active in the formative years of the current apprentice training system. The following excerpts from the General Engineering and Metal Manufacturing Industrial Training Committee (GEMMI), illustrate key issues for the metal trades.

Table 1. Craft apprenticeship intake registered with the DIT, 1972-79

	Building	Automotive	Electrical	Mechanical	Printing	Total
1972	64	31	27	12	-	134
1973	47	58	41	37	-	183
1974	116	142	60	146	-	464
1975	62	115	52	102	-	331
1976	120	103	83	160	-	466
1977	69	100	79	154	16	418
1978	126	266	131	194	1	718
1979	68	182	148	166	13	577
Total	672	997	621	971	30	3291

Source: DIT, Nairobi

Table 2. Technician apprenticeship intake registered with the DIT, 1975-79

	Building	Auto- motive	Electri- cal	Mecha- nical	Other			Total
					Food science	Textile tech.	Animal health	
1975	2	18	36	19	-	-	-	75
1976	76	1	50	31	-	-	-	158
1977	96	36	52	82	-	-	-	266
1978	80	20	154	80	26	11	1	372
1979	86	29	72	36	-	-	-	223
Total	340	104	364	248	26	11	1	1094

Source: DIT, Nairobi

Employers' key issues - in GEMMI

The General Engineering and Metal Manufacturing Industries Training Committee (GEMMI) was established as an advisory body to the National Industrial Training Council (NITC) in January 1974. Its main tasks were (a) to identify the type of employers to participate in metal-worker

training, (b) to propose the basis by which a training levy should be raised and also ensure that the cost of training shall be shared as evenly as possible between such employers and (c) to design such training programmes which shall secure the greatest possible improvement in the quality and efficiency of industrial training.

(i) Training levy

From the beginning it was agreed that a training levy must be assessed on the basis of all categories of employees at the rate of K.Shs. 100 per employee per year, payable by all employers whose main activities are general engineering and metal manufacturing who employ more than four people. According to this definition even the smallest firm was to be included in the "equal distribution of training costs" among the employers within the industry.

(ii) Syllabus

The draft syllabuses to be considered by the Technical Sub-Committee were already in use at the National Industrial and Vocational Training



Directorate of Industrial Training is responsible for craft apprentice training.



One of three Industrial Training Centres.

Centre in Nairobi and had been so for two years. They covered the City & Guilds requirements. This certainly set limits to the range of recommendations the Committee could submit. The Committee did, however, put forward recommendations about several trades¹ under its auspices, which would make the trades wider in scope than equivalent City & Guilds trades. For example a welder should be able to undertake some fabrication work, in addition to welding, and the syllabus for welding should therefore include the necessary skills for fabrication. For a turner the syllabus should include the first year courses for the fitter general. For the remaining trades a 5-year apprenticeship period was decided.

(iii) Defaulting employers

The recurrent and most discussed theme of the GEMMI has been “employers who are reluctant to train”. The DIT, Federation of Kenya Em-

1. The following trades were to be considered by the Gemmi-TC: (i) machinist (general), (ii) fitter (general), (iii) fitter (maintenance), (iv) welder (gas and electric), (v) turner, (vi) sheet metal worker, (vii) tool & die maker and (viii) diesel engine fitter (stationary).

employers (FKE), and the Bureau of Statistics have all been mobilized to register the number of potential employers who should pay the training levy and the DIT has been reporting the amount and names of the defaulters. By September 1974, 86 employers were registered but only 60 had paid the levy.

The Committee was aware that many employers had not registered. But as the DIT has never been staffed with the number of Levy inspectors required, a large number of particularly smaller engineering and metal manufacturing firms have easily escaped the obligations of the training scheme.

(iv) Apprentice wages

Lengthy discussions have taken place on apprentices' wages. The principle of "equal pay for equal work" was finally followed and a decision was passed that "Craft Apprentices in the General Engineering and Metal Manufacturing Industries be paid equal wages irrespective of the size of the firm employing the apprentice" (GEMMI, 24 Jan. 1975) (See Appendix A, Wage rates for apprentices).

The decision underlined a dilemma: On the one hand the principle of "equal pay for equal work" was honoured, but it conflicted with the principle of letting the smaller engineering firms pay lower wages to its employees than larger engineering firms would do. By running the risk of having to pay an apprentice higher wages than a long-term skilled employee, smaller engineering firms would be tempted to avoid the DIT training programmes – which is precisely what happened.

(v) Low reimbursement – commercial investment of training funds

It was not until January 1975 that rules were laid down for the reimbursement of training grants. The basis for reimbursement, which covers all training expenses incurred by the employer, includes (a) wages, (b) course fees, (c) annual grants for training facilities, (d) trainee subsistence allowance, (e) tools and overalls, and (f) examination fees.

A peculiar situation soon developed within most trades' training committees. Levy funds were piling up because they came in much faster than claims from employers for training re-imbursments. In 1975 decisions were taken to invest GEMMI's training funds commercially. An amount

of K.Shs. 340.000 was invested with the Cereals and Sugar Finance Corporation at an interest rate of 6½ per cent. Investigations into better alternative investment continued.

(vi) Allocation of training funds between private and public sector

In 1975 proposals for an Instructor Training Scheme were put forward. It was suggested that while undergoing the course suitable apprentices be identified and given the necessary training for becoming instructors. Employers protested against the proposal since it appeared that "Government will be using employers' funds for training its own instructors". Employers maintained that the Government had the responsibility for education.

(vii) Local enforcement of training

The topic of enforcing training obligations on employers has emerged off and on. In 1976 the Committee noted again that some employers in the industry, although they are registered with the DIT, have not paid any levy since the order was published. It was considered to be high time action was taken against these employers. The Committee agreed that these employers should be given fourteen days' notice to clear their levy liabilities. If they failed to do so the Director of Industrial Training could take them to court.

The Chairman of GEMMI considered that although the Government's policy has been to allow the employers to train voluntarily, a state might have been reached where the Government must find a way of forcing employers to train. This was because the employers did not seem to heed the appeals that had been made from time to time by the Government to interest themselves in training. He said further that he would not like to see those employers who take interest in training being discouraged because of poaching by those who do not train.

That the threat of legal prosecution has an effect is doubtful considering that no legal framework exists for prosecuting those who have not paid the training levy.

(viii) Poaching

Explanations have been sought for the somewhat disappointing participa-

tion of engineering and metal manufacturing industries in the DIT training programme. And *poaching* has been a favoured explanation. Employers have complained about the difficulties in retaining apprentices in the sponsoring companies when apprentices complete their courses. Poaching by other employers who do not take the trouble to train their own people has been used as an excuse by employers for stopping the recruiting of trainees. An additional argument has been raised that employers do not get back what they put in towards the cost of training and therefore they do not recruit many apprentices.

(ix) Apprentices to skilled workers ratio

The question of ratio – apprentices to skilled workers – has been subject to repeated discussions. The main purpose for determining this ratio was improving the recruitment of apprentices. Among the DIT-registered employers the tendency has continuously been to formally train only a minority. By July 1976 the relation was 30:101. And still representatives of the engineering and metal manufacturing industries have continuously agreed that there is a shortage of supply of skilled manpower. Consequently it has been argued that employers who have training facilities should recruit more apprentices. Thus, it was considered that the larger firms should be asked to train more apprentices than required in order to allow for spill overs to other smaller firms and the informal sector.

It became evident that problems would be encountered in implementing any form of set ratio. For example neither the General Engineering and Metal Manufacturing Industries Training Committee nor the National Industrial Training Council has the powers to enforce such a ratio. Also the definition of a skilled employee would have to be worked out. There was great confusion about this definition. Some considered a skilled employee to be a grade I craftsman. Others thought anyone with a grade III Trade Test is a skilled employee.

The issue of ratio as a basis for recruitment was resolved in an agreement that the ratio 4:1 of skilled workers to apprentices was too high. It was recommended instead that employers with 100 employees should have at least one apprentice. The Committee also recommended that the DIT should send a circular to all employers asking them to indicate the number of skilled personnel that they would like to train.

Many of the decisions in GEMMI have revealed that the Committee

has advisory status only. The Committee has put forward a number of recommendations and suggestions but on such a crucial issue as the much discussed problem of getting employers to recruit more apprentices, the Committee's weak status has been obvious.

(x) Syllabus-weakness

With regard to "design of such training programmes which shall secure the greatest possible improvement in the quality and efficiency of industrial training", re. GEMMI's terms of reference, policy statements have been largely missing. Training programmes basically follow City & Guilds requirements.

This lack of policy regarding the contents of training and its relation to local Kenyan conditions characterizes not only the engineering trades. It was the frustrations that emerged out of this situation which made the DIT prone to adopt the MES-based Kenya Intergrated Training System (KITS).

Since KITS – in theory – is designed according to existing labour processes in the local industries, it would overcome the dominating foreign training systems and the irrelevances of the syllabus being practised. The idea of KITS was thus a logical outcome of the prevailing deficiencies, no matter how mistaken some of the other premises on which it rests. (More on this below).

The Role of COTU in planning industrial training

The early and mid-1970s were the years when the apprentice training programmes for craft and technician apprentices in the metal trades were designed. The role of the tripartite body GEMMI in this process, discussed above, shows that COTU (Central Organization of Trade Unions) played no significant role in these important years when the training programme was being developed.

It would be wrong to conclude, however, that the employees' representatives had no impact at all. The mere presence of the Trade Union representatives may have guarded against decisions which would be one-sided at the expense of workers. If the Trade Union representatives were not outspoken about industrial training in these years, at least they steadily followed the work in the General Engineering and Metal Manufactur-

ing Industries Training Committee, and in certain cases forced through decisions according to their own policies. For example the Trade Union has been firm on the principle of training at home, and on several occasions pressure from the Trade Union enforced decisions of training locally instead of abroad.

Nor with regard to the technical aspect of the training programmes is it to be expected that the employee representatives would have significant opinions. In a trade union tradition such as Kenya's where Trade Union officials are rarely recruited from the rank and file, these representatives are usually not technically skilled themselves, and their insight into the technical salencies of the trades they represent thus also tends to be limited.

With recent developments in the labour market – the number of close-downs exaggerating already intolerably high levels of unemployment – there seems to be a strong case for suggesting that all parties concerned with unemployment take a renewed interest in industrial training. This certainly also goes for the Trade Unions. The tendencies embedded in the Kenya Integrated Training System (KITS) of turning the broad-skill training system into a training system of machine operators, for whom there will be limited jobs available in modern industries, support this point.

National training policies and practices

From broad skill training to Modules of Employable Skills (MES)?

In theory the Central Government in Kenya stimulates and guides, controls and coordinates industrial training on a national basis through the levy-grant scheme set up under the Industrial Training Act. The training levy-reimbursement system is administered by the Directorate of Industrial Training (DIT).

In order to avoid wasteful duplication or serious omissions, industrial training programmes must be based on some manpower forecasts and estimates of manpower needs.

There are at least six agencies in Kenya operating independently to collect statistics on manpower and training needs. And still statistics on manpower in Kenya are poor for manpower planning purposes. As noted by UNIDO, manpower data are "in most cases collected for the record rather than for action, so that despite this potential wealth of information it is not

made use of for planning" (UNIDO, 1981, p. 43). In the absence of a full-scale manpower survey since 1972 (which was undertaken but never published in full), manpower estimates have to be based on scattered sources. In general these sources use highly aggregated categories or confine themselves to particular industries. In the absence of comprehensive and regular manpower forecasts, industrial training has been determined by ad hoc decisions.

In the past the emphasis of the Government's training efforts has been on training broad-skilled craftsmen. "This was because their skills are the foundation of industry – no company can maintain its machines without a competent fitter and electrician". (UNIDO, 1981). To this explanation can be added that the traditional apprenticeship trades which are offered in Kenya are modelled on the City & Guilds. Certain modifications have sneaked in as aid donors have introduced training elements particular for their national training-system. But apprenticeship training in Kenya is still fundamentally based on the City & Guilds tradition, its trade divisions, proficiency requirements, curricula etc.

Some may question that City & Guilds is regarded as being geared to training broad-skill craftsmen. In fact, City & Guilds has been criticized for including too many specialized skills for the Kenyan economy. However, in comparison with the newly adopted Kenya Intergrated Training System, described below, the traditional City & Guilds based apprenticeship training must be characterized as broad. It encompasses a theoretical component and introduces related technical disciplines, which makes it a more comprehensive approach than the narrowly job-oriented KITS.

Appreciating that the existing apprenticeship system can be characterized as broad skill only in relative terms, it is as true for Kenya as for the developing countries in general that many of the existing patterns of training have been modelled on those used in industrialized countries: all too few have been properly adapted to local conditions.

As a response to this situation which from any economy's point of view is unsatisfactory, the Kenya Government through the DIT has undertaken to Kenyanize industrial training. Conserted efforts are made to develop and implement the *Kenya Intergrated Training System, KITS*.

The project is based on the *Modules of Employable Skills, MES*, to which the ILO devoted enormous efforts and resources over the last 10 years. In essence the KITS/MES is moulded to suit operator training and other limited-skill training. If fully implemented it is difficult to imagine that the

project would not mean a serious discontinuation or reduction of broad-skill craft-training. Obviously this will influence the potential mobility of workers in the labour market. It therefore becomes highly relevant to discuss the consequences of the introduction of KITS.

There are so far very limited experiences with MES training on a global scale. Indeed, Kenya is the first country to accept the ILO's MES-system with the intention of trying it out on a national scale. If our assumption is correct, the KITS will tend to produce a worker who is geared to do very standardized operations with high perfection – to the advantage of the single employer, maybe. For the individual worker *and* for the economy, the consequences could be very negative. In fact, it is postulated here that an industrial break-through in the “heavier” import substitution industries is very unlikely to take place unless much more effort is put into the training of broad skilled craftsmen.

The essence of MES

Basically Modules of Employable Skills – popularly known as MES – is an ILO invention in *vocational training methods and techniques*. (ILO/SIDA 1981). The ILO has worked on MES development since the early 1970s.

MES rests on the premise that there is a great need to *systematize* and *standardize* vocational training in developing countries and at the same time make it *adaptable* to the requirements of different societies. MES also intends to *minimize* “*overtraining*” in developing countries.

Some of the more characteristic features of MES have been summarized as follows:

1. Step-by-step activity (based on Skinner)
2. Profusely illustrated – with photos or drawings
3. Standardized presentation in booklet form or a loose-leaf system
4. Reduced development costs
5. Modular in approach. Progression is achievement based not time based. Individual self-pacing
6. The instructor is retained but in a new role as “supervisor”, since MES is self-instructional for the individual trainee
7. Employment oriented (the single most important feature)

8. Adaptable to new jobs, new environments, new technologies, i.e. training programmes can be composed as needed in new situations.

Another salient feature of MES is its administration. The great bulk of the learning elements will be developed in Geneva where the ILO will establish a "learning element bank" from which interested parties can request materials. How the economy of this "bank" will be worked out is not clear. So far donor countries have been paying the bill through the ILO and not the industries that are supposed to be prospective users of the MES system.

Some observations contest the basic assumptions of MES:

- Occupational analysis, i.e. an analysis of the *particular* skill-requirements in particular production processes and local enterprises seems to contradict the assumption that MES addresses itself to an "international target population" rather than to a national one. One may fear that MES-adaptability becomes devoid of content, or alternatively, the "matrix" of learning elements from which to draw relevant material must be of enormous and, therefore, unrealistic, dimensions.
- The rate of production of elements is already so time-consuming that it is feared, the "bank" will always be lacking in "capital", and no full programme can be prepared.
- Estimates from the ILO show that the actual cost of development per learning element in 1981 was US dollars 1600 to 1800. With the number of elements required – which exceed 200 elements for a full trade of masonry alone, to take an example – and considering the continuous need to update learning elements, it is not immediately obvious that this contributes to minimizing costs for curricula development.
- The self-pacing approach is a fundamental break with the type of pedagogy in force in most developing countries, where very little is left to the individual's own judgement of his/her progression. The theory that students should progress at their own rate may be excellent for the better students but causes a wider gap between these and the slower students. MES' whole lay-out – detailed photos or drawings with short explanatory texts are built on western traditions of perception that are not often seen in educational materials in developing countries.
- Since the MES material is to a great extent doing-oriented it means that

the knowing element, knowing not only “how to do but also know why to do”, is given less consideration and may lead to less understanding of applied procedures or regulations.

- The philosophy behind the MES will too easily lead to training systems which are not aiming at creating real craftsmen, who could be entrepreneurs etc., but some specialized workers who can follow instructions in a narrow field of work and who are very sensitive to changes in technology and in the job situation. In other words MES tends to prepare the learner for doing repetitive operator functions with high precision, not to give him an insight into the principles of his trade – not to mention an insight into his role in the production process or into the functioning of his society. In the MES philosophy this insight tends to be synonymous with “over-training”.

The worker’s flexibility within the present production system will tend to be limited, i.e. he is not prepared for job-rotation, job-changes, etc. The introduction of new technology will require retraining.

The claimed flexibility and adaptability of MES is thus a feature of the *modular training system*, which is something quite different from providing the individual worker with adaptable and flexible skills.

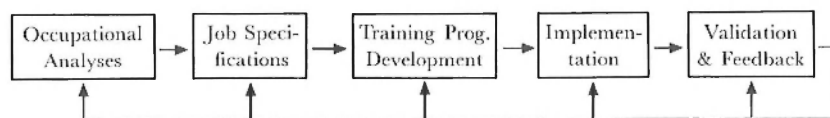
The essence of MES has been described in some detail since its implications are far-reaching with regard to the development of labour skills in a longer perspective. With the implicit narrow-skill provision, a MES-based training system is counter-productive to a change towards intermediate and capital goods production in the manufacturing sector. This might be of limited importance, if the MES training system were kept within a few industrial sectors as has happened in the few countries which have so far experimented with MES. However, in the extraordinary situation in Kenya, where the MES system has been adopted on a much larger scale to substitute prevailing craft training and has also been suggested for “training for the pool”, the consequences may be devastating. Under the name Kenya Integrated Training System, KITS, the Ministry of Labour with a massive input of ILO curriculum development advisers, is working on substituting the current apprenticeship training system by the KITS-system. The system will be briefly described before the ‘rationale’ behind its introduction is discussed.

The Kenya Intergrated Training System, KITS

KITS is the cornerstone in a joint Kenyan/UNDP project, signed in 1980 (UNDP/KEN/79). ILO is the executing agency. To implement the project a new unit has been established as part of the Directorate of Industrial Training under the name of Curriculum Development, National Coordination Services and Technical Support Branch.

The long range objective of the Project is the development of greatly expanded and updated curricula for a variety of worker categories so as to increase employment opportunities. The efficiency and effectiveness of training will be greatly increased by a new 'intergrated system of training' which ensures an accurate interface of the skills required by employers and those provided through existing training provisions (UNDP/KEN/79).

The Intergrated System consists of five separate but directly related sub-systems. Each sub-system being complete in itself, but designed to work at maximum efficiency in conjunction with the Intergrated System as a whole. A simple block diagramme illustrates the System:



The first sub-system is concerned with *occupational analysis*, i.e. the requirements of a whole industrial sector, or a complete enterprise, is examined in detail. From the data extracted, accurate *forecasting* of all categories of trained labour requirements is possible. It is believed that enormous *savings* can be made in terms of both money and time.

The keynote of the second sub-system – *job specifications* – is *accuracy*. A job is broken down into its component parts. The larger areas of activity are called “Tasks” and the breakdown of each “Task” is identified as “Task Elements”. On the basis of “Task Elements”, “Task Learning Data” are constructed. Task Learning Data is what was previously called curricula.

The taylorist principles in this system are obvious and clearly revealed in this quotation: “... it will be noted that all the technical knowledge, aspects of safety and hygiene together with the practical exercise required to master the skills involved with the activity are carefully identified in direct *relationship* to the smallest part of the job concerned.” (DIT, 1978, p. 5).

The third sub-system, *Training Programme Development*, is where the much feared "over-training" is dealt with. To quote, "when curricula is developed in such precise accordance with job requirements, it is comparatively easy to eliminate 'nice to know information' and ensure that *only 'essential to know' information* is presented to the trainee or learner or student or whoever! It need hardly be said therefore, that such a provision must of necessity represent the epitome of both efficiency *and* effectiveness! Because it ensures the best possible way of ensuring complete interface between the skills required by the job/employer combination and those presented for learning by training centres and other establishments." (DIT, 1978, p. 6).

It is striking how the trainee/learner has been overlooked as a third party to the interface between skill requirements by enterprises and training provided by different establishments. The objectivization of the trainee is obvious.

The fourth sub-system, *programme implementation*, is where the physical break with the conventional training set-up comes in. The new training system will involve *specialized cubicles rather than classrooms* and *separated work areas rather than wide open workshops* where noise, dirt and other distractions reduce the efficiency of the learning process.

It is not least this aspect of KITS which has been worrying donor agencies, since it is envisaged the consequences for the physical layout of the training place will be radically changed.

The fifth sub-system – *Validation and Feedback* – is "a most important and critical provision within the Intergrated System". It is going to make up for some of the mistakes and misunderstandings of the past, brought about largely because of a lack of dialogue between training establishments and industrial employers. The following quotation reveals how far reaching the consequences of feedback are expected to be: "The provision of such a real-time feedback of information ensures not only that Training Programmes are really effective but provides for rapid changes to curricula as and when required by changes of equipment, processes and required skills in industry!" (DIT, 1978, p. 7).

The enthusiasm in DIT's presentation of KITS is overwhelming. An enthusiasm of this "correctly applied closed loop" with nothing less than optimum levels of efficiency and effectiveness and uniformity of skill patterns!

In essence, the KITS was established in 1979 in order to develop a *Kenyan identity* in relation to industrial training and to effectively introduce *uniformity* and *standardization* to national training provisions. Through the ap-

plication of the ILO's MES concept of training, training programmes are supposed to become more *flexible, efficient* and *effective* in training the nation's workforce at all levels wherever and whenever possible.

Rationale for the introduction of KITS

The rationale for the introduction of KITS is expressed in the Kenyan Government's (DIT's) response to what it felt were shortcomings of the conventional apprenticeship and other training systems in operation in Kenya. These are rightly seen as being foreign and arbitrarily developed and the training as being unsystematic, time-consuming, inefficient and ineffective, inflexible and containing superfluous information, etc. Thus,

“curricula in the immediate past has invariably been developed in an arbitrary sense, using perhaps the British City-and-Guilds as the basis and applying foreign standards, that is if standards were thought of at all! Little or no concern has been shown for the real needs of Kenyan industry and Kenyan trainees! This of course has resulted in a lack of interface between the skills required by industry and the skills being taught at training centres. – It need hardly be stated the degree of inefficiency here is almost unbelievable.” (DIT, 1978, p. 4).

Due to its self-contained structure, it is expected that KITS will remedy the shortcomings of the old system. The rationale for the introduction of KITS, however, must be found in the dictates of industry. The point made here is that the *initial* rationale for the introduction of KITS is based on some basic assumptions about the direction of industrial development in Kenya. It is postulated that these assumptions are of fundamental importance for evaluating the relevance and progression of KITS. They are discussed forthwith. About industrial development trends to which KITS shall contribute a better interface between industry's requirements and industrial training institutions' labour output, the Government has the following to say:

“It is now evident that the system of training which has been going on since 1971 cannot succeed in meeting the country's current and future requirements. Training provisions which were considered adequate just a few years ago, are being rendered obsolete very rapidly, by the changing

demands of the whole spectrum of industry and commerce. *Many jobs have disappeared, replaced by automation, new materials and more efficient methods of production. At the same time new industries and many new jobs are emerging in response to expanding consumer requirements and other national development aspects.*" (UNDP/KEN/79/006/ p. 4) (emphasis added).

DIT (1978) has this to add: "... we face a period of enormous growth industrially, where many new companies and many new jobs are emerging in response to expanding consumer requirements, both for the *home market* and for *export internationally*" (emphasis added). The document goes on to analyse Kenya's training provisions for the immediate future when, as it is said, "we shall see Kenya sustaining its position as a leader in African development and economic expansion."

Short as these quotations are they nevertheless reveal the basic assumptions behind KITS: The trend of industrial development in Kenya is seen as being expansive at the home market as well as in the international export markets; new technologies – including automation – are quickly replacing out-dated ones and completely new jobs are being created.

One will recognize the parallels to assumptions behind policy changes for industrial production in the country. These are the changes towards competitive export oriented manufacturing that are supposed to solve the problems created by the import substitution strategy. And one will recognize in the assumed manpower implications of the changed industrial development strategy a number of principles which are continuously being repeated as fundamental – both to export manufacturing industries and to KITS: *efficiency, effectivity, uniformity, standardization, and cost-saving* devices.

Given this background it becomes easier to understand why it was thought appropriate to modernize industrial training through the introduction of KITS. It was simply a dictate of the new industrialization strategy to increase industry's command over labour, to raise the workers' efficiency in correspondence with world market competition, which could only be met by a high degree of production uniformity and standardization and increased labour productivity. To this end revision of the industrial training system along MES principles would increase industry's labour control.

While the Kenyan Intergrated Training System, KITS, looks like a perfect desk model for a full industrial training system, "complete in itself" as a self-contained closed-loop system, it raises a number of critical questions.

These questions concern both the *feasibility* of the new training programme in terms of resources required to develop and implement it to a satisfactory level (see Appendix B) but, more fundamentally, the *desirability* of turning to these tayloristic, limited-skill provisions, considering the *social implications* of this change.

The postulated *savings* of KITS are highly exaggerated. According to my own calculations savings are at best to be expected in some distant future; moreover the “savings” appear because the costs of developing the vocational training system have been shifted from industries to the Kenyan state (DIT) to a higher degree than what was previously the case. There may be short-term savings to be made by training workers only to the bare minimum of “necessary to know”, the KITS being “cleaned” of “nice to know” information. However, the *social cost* for the industrial worker as for the economy, in terms of a narrow and rigid skill basis may be serious and counter-productive to relevant economic structural changes.

“Need versus effective demand” in Kenya’s industrial training

Much of what has been said about the ongoing industrial training reforms in Kenya has been based on assumptions about industry’s demand in general for certain labour skills and qualities of the labour force. For planners of industrial training, the training system is likely to be regarded as efficient if it responds in a flexible manner to changes in the labour market and ensures a continuing balance between demand and supply. For the concerned trade unionist, for the concerned scholar or for the concerned population in general, training systems are usually asked to do more than this – not merely to respond to the pattern of *effective demand* but also to relate to the variously defined *needs* of an economy and society (M. Godfrey, 1979). And we could add – the *social implications* of the training system, its effect on differentiation of the labour force, the attached wages and benefits, the effects for workers’ employment security, for labour turnover, mobility etc. all of which influence the level of reproduction of the worker and the worker’s family. These are greatly significant implications and therefore deserve to be considered when training systems are being assessed.

The massively dominating analysis of industrial training in developing countries has a market-oriented point of departure if not the mere institutional descriptive approach. (For example J. R. Sheffield and V. P. Diejomaoh, 1972 and J. S. McNown, 1970). There is a certain tradition for

assessing the social effects of *general education* in terms of distribution of resources. In the case of Kenya, excellent analyses are found in works by Somerset (1973) and K. Kinanjui (1974). In terms of assessing the socio-cultural historical context of industrial training, first of all in the informal sector in Kenya, King has contributed very enlightening material (1977). But it is only in recent work that the case of training in Kenya is examined in the light of the distinction between effective demand and need (M. Godfrey, 1979).

What is new in Godfrey's approach is that he raises a number of questions – however very sketchy – which arise if the “distribution of unsatisfied needs” is taken as the starting point for planning education and training. The focus of need oriented planning would initially have to be outside the training system, and Godfrey then estimates the magnitude and identifies the distribution of unsatisfied needs for adequate nutrition, water, housing and health in Kenya.

“All this might be thought to suggest a blueprint for a need-oriented training system which would turn out experts in, say, eco-systems in low-potential areas, small farm technology, basic food crops, pastoralism, nutrition, home economics, rural water supply, urban low-cost housing and rural preventive health care; indeed a need-oriented training system would have these components” (M. Godfrey, 1979, p. 193).

Godfrey suggests several measures that would help facilitate a restructuring of industrial production towards the internal mass market. Redistribution of land, for instance, would lead to a larger and more equally distributed agricultural output and would reduce migratory pressure on the towns and marginal rural areas. And a narrowing of formal-sector income differentials via government pay policy would pull in the same direction. These changes in the structure of production and of income would themselves bring need and effective demand closer together, but they would have to be supplemented by changes in the structure of government services. In short, there would be no point in trying to change the content of training, reflecting as it does, albeit imperfectly, the current pattern of effective demand (for designers and builders of high-cost mortgage housing, curative medical workers, brand-specialist automobile mechanics, to mention some) unless the pattern of demand was also changed – by changes in the structure of production and/or by government counterbidding in the market for trained persons. “Given such changes on the demand side the changes that would be needed in the content and structure of training

would indeed be drastic. They would certainly involve a move away from the current traditional, market-oriented syllabuses and qualifications, particularly at professional level but also at semi-professional and skilled levels." (M. Godfrey, 1979 p. 193–194).

Godfrey has opened up a new perspective on industrial training in Kenya i.e. training as a means to meet unsatisfied needs of the society. – But perhaps the most difficult question, as he himself suggests, to which thought has hardly begun to be given is what changes in the *content* of training would be implied by a serious move towards need-oriented planning.

The ongoing reorientation of industrial training in the Kenyan Integrated Training System, KITS, will not give an answer to the question of relevant contents in a need-oriented training system. On the contrary, KITS is a market-oriented training system, its idea being to bring about a better balance between industry's effective demand for particular labour skills and the training system's supply of trained labour.

A need-based industrial training programme – The Village Polytechnic Programme

Contrary to the Ministry of Labour's industrial training programmes on which the above discussion has concentrated, the Village Polytechnic Programme is in principle a need-oriented training programme.

The aim of the Village Polytechnic Programme is to offer unemployed primary school leavers opportunities for training and practical experience that will improve their prospects of obtaining employment in the rural areas where they live. By giving courses which would be of particular relevance in a local community – for example water irrigation, appropriate technology/agricultural courses etc. – the idea of the Village Polytechnic has been to meet both the need for products and services in the local society *and* the need for employment of school leavers.

It is, however, obvious that the intended openness and flexibility of the programme has materialized only in very few instances. There has been a tendency towards stereotyped training courses for only a handful of conventional trades (see Table 3).

The intended flexibility in the length of training courses has also tended to formalize and settle into a two-year course. But these signs are not the only ones indicating that the need-orientation of the Village Polytechnic Pro-

Table 3. Distribution of trades of the Village Polytechnics, 1981

	Percentage of all courses
Carpentry	17
Masonry	17
Home economics	16
Tailoring	15
Metal work, plumbing	11
Agriculture	11
Leatherwork, tannery	6
Motor mechanics	4
Commercial	2
Electricity	1
	100

Source:

DANIDA. *Village Polytechnic Programme in Kenya. A report 1981.*

gramme is being undermined. Thus, a recent evaluation report (DANIDA, 1981) recommends that examinations be introduced and a system of grading be developed to ensure equal standards of examination in all Village Polytechnics. The issuing of a certificate based on the examination results is also recommended.

Such recommendations if questionable in themselves only reflect the pressures in society to formalize training according to standards which employers accept. And they reflect the fierce competition for wage work in a situation where setting up one's own business in the rural areas or in the "informal sector" is up against so many odds which two years vocational training in a Village Polytechnic can do very little to diminish.

Another sign of formalization and market-orientation of the Village Polytechnic Programme is increased government control. The expansion of the village polytechnics definitely reflects a widespread need for training. From the start of the first Village Polytechnic in 1968 under the sponsorship of the National Christian Council of Kenya the number increased to 10 in 1970. All Village Polytechnics are founded on a self-help basis, but from 1971 the Kenya Government launched a major programme of assistance. Between 1971 and 1980 the number of government assisted Vil-

lage Polytechnics grew from 20 to 250 and the number of trainees increased from 600 to 25,000.

During a short-lived period, 1979–80, the Village Polytechnic Programme was under the administration of the Ministry of Labour. It was understood that the reason for this transfer from the Department of Social Services was that the Village Polytechnic Programme should be an integrated part of the technical education in Kenya rather than a social programme. This is also reflected in the project documents of the Kenyan Integrated Training System, KITS, discussed above, which clearly see the Village Polytechnics as one training-set-up, where the MES-based training approach will be introduced. However, as of July 1980 the programme was moved again, first to the Ministry of Urban Development and Housing – later in 1981 to the Ministry of Culture and Social Services.

It may turn out that the idea of keeping the Village Polytechnic Programme as a need-oriented training programme cannot survive no matter to which ministry the programme is attached. The pressures to bring the programme in tune with the rules of competition in the labour market, the demands for examinations, for trade tests and certification, are strong, and may turn the Village Polytechnic Programme into another market-oriented training programme at the bottom of the industrial training hierarchy.

It remains to be seen whether the Harambee Institutes of Technology will take up the challenge of becoming a need-based training programme. The Harambee Institutes certainly contain this possibility as long as their formalization has not yet been agreed upon. It may well be argued that the Harambee Institutes of Technology by offering a varied range of specialized courses adjusted to local needs – such as eco-systems in low-potential areas, small farm technology, rural water supply, low-cost housing, rural preventive health care etc. – would better secure their own survival. However, as it is today one may expect, that the Harambee Institutes of Technology Programme will develop into yet another competitive training programme and try to base itself on labour demands of the industrial labour market which may already be satisfied by the supply from employer-controlled apprenticeship training.

Conclusion

Reforms in industrial training in Kenya in the 1970s created a tripartite framework for regulating the interface between industry's demand for



Difficult to recruit young people for training in highly demanding, skill intensive foundry- and casting work.

skilled labour and the output from the industrial training centres. Introduction of a training levy/reimbursement system would help to increase and to share the responsibility and costs of training more evenly in the labour market.

If the trade unions, COTU, had played an active role in the tripartite apparatus on behalf of the workers, COTU would have seen that manufacturing was not developing along the lines on which the MES based KITS was planned. The expansion of competitive, export-oriented industries using vast numbers of limited-skill operators did not take place as anticipated.

COTU would also be aware that the current training policy reforms contradict COTU's own stands on a central issue, namely COTU's repeated demand that the minimum wage system be abolished. If this is done, workers are left to free competition in the labour market. In such a situation workers would certainly need full encouragement and support from COTU to increase their ability to compete. In that respect a wide skill basis is of more help than what KITS seems to offer. Likewise, the person who is forced to struggle alone in the informal sector will also be better equipped with a broad skill.

This chapter has shown that the process of motivating a wider range of industry to take a more systematic interest and approach to training is a slow one. Economic recessions stand in stark contrast to KITS ongoing industrial training reforms. KITS may help the employers save training expenses for a range of machine operators. But making apprentice training narrowly job-oriented in times of economic recession and industrial slow-downs is obviously confining the potential mobility of the workers in the labour market.

Kenya is moving towards a competitive, export-oriented industrial development strategy. And the industrial training system that is undergoing reforms in its shadow is being pulled in the same direction. The way is stony, competition in the world market is tough, and the positive results of the policy changes are yet awaited. What is equally problematic, however, is that reforms further complicate – maybe even cut off – a possible direction of change for which it is believed Kenya still has a potential – the shift towards a heavier import substitution strategy. A shift that would centre on developing the Kenyan economy internally – keeping the necessary international links, *and* providing the basis for more local employment than the case is today.

It may be that the prospects for an industrial transition, in which the metal craftsmen play a central role, are painted too bleak. The following observations in this chapter indicate that the potentials have not been totally jeopardized:

- The transition of the broad skill apprenticeship training towards narrow skill operator training took off in building and textile trades. So far there are no signals that the metal trades will be subject to a KITS-transformation in the foreseeable future.
- If craft apprenticeship training in the metal trades – contrary to expectation – is shortly transformed according to KITS principles, there may still be openings for comprehensive craft training in the forthcoming Harambee Institutes of Technology. One may fear, however, that this system like the Village Polytechnic Programme, will be pulled in the direction of narrow employer demands away from a need-based orientation.

This chapter has outlined features of the public training policies concerning metal crafts. The next chapter turns to the company level and in particular focuses on the individual craftsmen.

Chapter 3

Workmanship in the engineering trades in Kenya – Two company profiles

Introduction

In view of the claimed scarcity of skilled craftsmen in Kenya, one might expect that industry would apply a wholehearted and systematic approach to training. It is, however, striking that only a small minority of private manufacturing firms systematically take advantage of industrial training institutions. This is supported by figures on the recruitment of craft apprentices, Table 1.

Obviously, the introduction of the training levy and other industrial train-

Table 1. Recruitment of craft apprentices, January-June 1980, in general engineering and by size of firm

	General engineering		All trades	
	No. of firms	No. of apps.	No. of firms	No. of apps.
Government & parastatal	3	245	6	263
Private over 500 employees	2	15	14	110
200-499	5	41	10	69
100-199	4	13	4	13
50- 99	1	3	1	3
20- 49	1	1	3	3
5- 19	-	-	-	-
Size distribution na	3	3	50	185
Other	-	-	1	4
Total	19	321	89	640

Source: DIT and UNIDO, 1981 p. 85.



The local Asian fundi is a rare craftsman in Kenya in the 1980s, contrary to 1942 when this picture was taken of the labour force in one of the general engineering companies in the study.

ing reforms of the 1970s have not been able to change the picture – that Government and parastatals are responsible for the vast majority of apprentice training. Among the private firms only the larger firms seem to train through the Directorate of Industrial Training.

Several questions and hypotheses arise from these observations:

- Does the limited support for the industrial training programmes by private manufacturing industries indicate that in reality there is no shortage of technically skilled manpower? Or,
- is the limited participation in formal industrial training by private firms an indication that the quality of training in the institutions is unsatisfactory? I.e. is the cost/benefit of the training programmes considered to be too high?
- A third possible explanation may be that whatever need for skilled manpower individual firms may have they prefer to train workers on-the-job – for economic or quality reasons, or merely as tradition.
- The “pool” of technically qualified people who have acquired their skills in public enterprises, in technical schools or in other private firms may be large enough to satisfy the need of those firms which do not them-

- selves engage in training. Thus, poaching for example is maintained to be frequently practised, although poaching of skilled manpower will generally require readiness by the firm to pay higher wages.
- It may also be asked if the increasing number of industrial close-downs in recent years have set free a number of skilled workers who are now available in the labour market. If so this would further diminish industry's need to engage in industrial training.

Some of these questions were discussed in general and for the engineering manufacturing industries in particular in the previous chapter. In this chapter they are reflected upon through more detailed analyses of two firms: (1) a general engineering manufacturing company and (2) a fabrication and maintenance workshop in a sugar factory. The documentation includes profiles of engineering craftsmen's work- and social situation in the two companies.

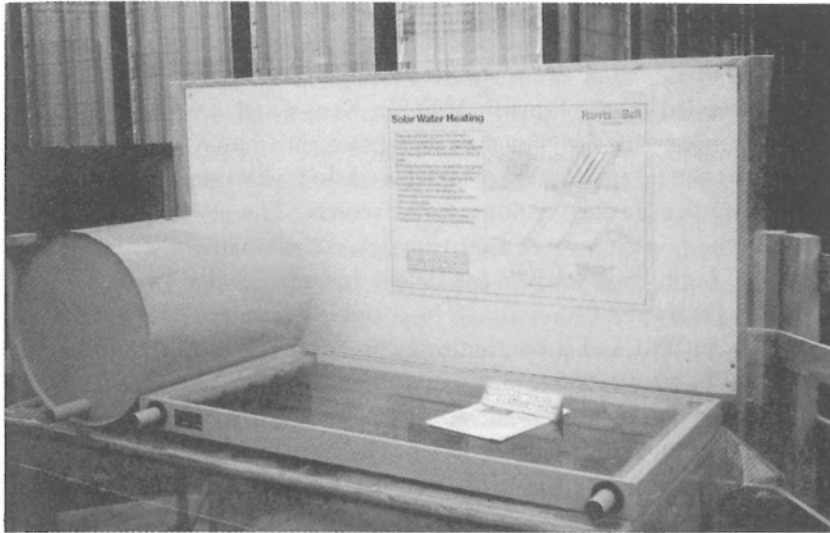
Company 1: general engineering manufacturing

Brief history, production and company organization

The firm is one of the oldest manufacturing firms in Kenya. It started production in 1904. At the beginning, the firm was primarily doing plumbing and tinsmith work. The development of the firm has been gradual – towards engineering work. Today the firm employs approximately 120 people. They manufacture a wide variety of engineering products such as conveyors, tea-machinery, elevators, winches, driers, separators, chassis, playground and sports equipment, gas-cylinders, vessels, cookers, petrol tanks, gates and many others. Production is mainly based on orders. A good deal of repair work is undertaken.

The firm has maintained a production pattern which has almost completely disappeared in the engineering industry in the Western industrialized countries. It operates a full production process from the preparation of raw materials at one end to the final finishing and distribution of the products of the other. The workshop is organized according to the succession of heavy metal equipment production: i.e. the firm has its own foundry, a joining/welding shop, a blacksmith shop, fabrication shop and machine shop.

The cupola furnace is used approximately once a month for smelting scrap iron. There are metal smelting furnaces for making alloys. A storage



Introduction of modern technology: solar water heating.

in the carpentry workshop contains hundreds of different patterns and models for the most varied products which have been made over the years. These models are moulds for castings which are final products or are being used as intermediate inputs in the firm's production.

The major raw materials are, however, steel plates and steel bars, which are purchased from local steel stockists. Approximately five pct. of intermediate inputs are purchased from the UK.

From the list of machinery (see Appendix D), the number of specialized machines for the successive steps in the production process can be seen. These machines are for cutting, shearing, rolling, bending, grinding, hammering, welding, milling, trimming, planing, turning etc.

The machine park contains approximately 50 machines and other heavy equipment. All machines are of an older make, most being at least 25 years old. There are boiler test pumps and equipment for testing pressure resistant vessels – the speciality production of the firm. Filing off rough edges and painting is given as the final finish before the product is delivered directly to the customer or is distributed through an agent.

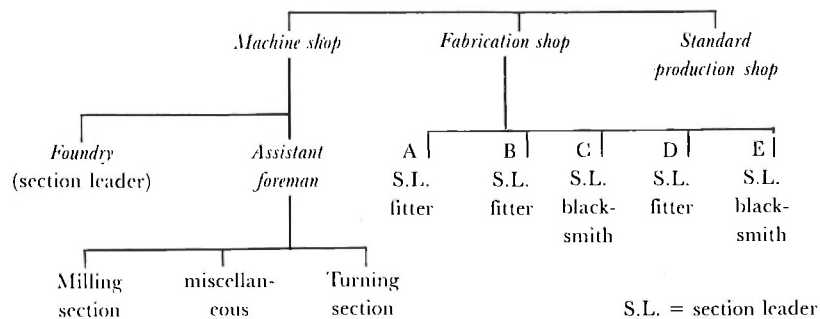
The firm is privately owned, and in 1963, the year of Kenya's Independence, it was incorporated as a limited company. In 1978 the firm was

bought by a Scottish based multinational corporation, in cooperation with its subsidiary in Kenya. The board of directors comprises three British and two Kenyan directors, who simultaneously hold directorships in other firms controlled by the Scottish MNC in Kenya and East Africa. On its part, the engineering firm bought a metal furniture manufacturing factory, in 1971. At the takeover, a sheet metal workshop was transferred from the engineering firm to the furniture manufacturer. The work force then declined to the present level of approximately 120 employees. The majority of the 100 production workers are skilled and semi-skilled workers.

Until recently the firm was run by a single managing director. He retired early in 1981 and is now acting as an advisor to the firm. Today the firm is run by a team of five managers – four are Europeans, one is a Kenyan Asian. With the “multinationalization” of the firm in 1978 a modernization of the organizational structure has been started. A reorganization of the physical layout (see Appendix E) of the workshop has already begun. Machines have been spaced, put in line, overhauled and painted, and subdivision of the workshop floor is in preparation. The work force in the two major production entities – the machine shop and the fabrication shop – is being restructured into smaller sub-sections (see Figure 1 and Appendix E, Physical Layout of Workshop).

Each section will be headed by a section leader. He will be in charge of 5–9 skilled workers and a few labourers. For a Kenyan general engineering workshop this is an exceptionally clear organizational set-up. At the time of visit, April 1981, several section leaders and foremen with no previous supervisory responsibilities were still on probation.

Figure 1. Production section



In addition to these organizational changes, management is planning to extend batch production by adding a standard production section. This is intended as a means to meet tough competition and to get into export manufacturing. At the moment, the firm has a certain amount of batch production of cookers and gas cylinders. It is the plan to expand into batch production of solar heaters, assembly metal huts and different sports ground equipment.

A major item will be the assembly and production of hydraulic pumps for which a separate section is under implementation. Pump assembly or manufacturing is expanding in Kenya at the moment. It has been mentioned as a priority line of production in development documents as an auxiliary of water-projects, which is a priority undertaking in agricultural development. There is no import duty on pumps. However, the firm had not yet in 1981 been able to obtain an import licence for the kits to be assembled. Batch products will primarily be distributed through agents.

Another element of the policy changes in the firm are plans to do more advertising (at the Nairobi Agricultural Show for example) and look more actively for orders than the practice has been so far.

In 1979 the share capital of the company was increased from 500.000 K.Shs. to 1.800.000 K.Shs. The Scottish MNC (E.A.) controls 65 pct. of the shares, its subsidiary (Nairobi) 35 pct. of the shares. The workshop premises are rented from the former general managing director. Machinery and equipment is valued at approximately 3 mill. K.Shs. (1980). The firm has a production goal of 1 mill. K.Shs. output per month. To reach this goal the order book must be at 4-5 mill. Shs. It is difficult for the firm to maintain this level of orders. In 1980 the order book fluctuated between 1 mill. and 4 mill. Shs. And during the first months of 1981 the order book varied between 1½ and 2 mill. Shs. This means that machinery and equipment are not being used to their full capacity. The firm operates one day-shift only. Considering the difficulty of measuring capacity utilization in a factory with very differentiated production, the production manager nevertheless estimates the capacity utilization to be approximately 50 pct. The management aims at a 100 pct. increase of production, seeing great potentials in Kenya despite the general recession in the economy and competition from a large number of small engineering firms. The ongoing reorganization is one of the means to increase productivity.

The work force at the firm

(a) Kenyanization

Engineering more than any other manufacturing work, had been the domain of Asian 'fundis' until the late 1960s. To some degree this is still the case. For many generations smithing and engineering skills had accumulated in certain Indian families. Asian emigrants to Kenya made up a highly skilled labour force in the early and mid-century. From 1968, however, work permits had to be obtained annually for non-Kenyan citizens. From that year onwards many Asian craftsmen decided to leave Kenya due to the general feeling of uncertainty about the future.

As in other engineering firms, the production workers in this company, until recently, were largely Asian. The exodus of Asian workers from the firm accelerated after 1968.

Today all production workers (approximately 100 including labourers) except for one Asian fundi, who has been with the firm since 1937, are Kenyan Africans of different ethnical background.

By training workers on-the-job, and partly by making use of the Government's training programmes, it has been possible to maintain productivity



Highly skilled craftsmanship.



Using heavy machines of older make.

in connection with the kenyanization of production. At the supervisory level Kenyanization has started but the expatriates and Kenyan Asians are still in the majority.

(b) Job and skill profile

There is no sharp distinction between skilled² and semi-skilled³ workers in the firm. Nor is there a sharp distinction between semi-skilled workers and labourers⁴. The production- and personnel manager estimated the job and skill distribution of the 120 employees as set out in Table 2. The table also indicates the distribution of people interviewed.

2. A common definition of a *skilled* worker is someone who needs a craft test certificate for his job. Someone who not only operates but also sets complicated machinery is normally regarded as "skilled".

3. A machine operator who operates a machine with more than one function, but does not set the machine, is normally regarded as a "*semi-skilled*" machine operator.

4. A machine operator who operates a machine with only one simple function is normally regarded as a "*labourer*".

Table 2. Job and skill profile, April 1981*

Occupation/trade	No. of persons	No. of interviewed
<i>Skilled and semi-skilled workers</i>		
Fitter ¹⁾	14	7
Welder	13	5
Turner	8	2
Moulder ²⁾	6	2
Blacksmith ³⁾	6	3
Guillotine & press operator	2	1
Driller	1	1
Screw machinist	1	1
Planer	1	1
Plumber	1	1
Apprentices	12	5
Total	64	29
<i>Labourers</i>		
Permanent ¹⁾	30	3
Casual	10	0
Total	40	3
<i>Supervisors</i>		
Chief Foremen ³⁾	4	4
Section leader ⁵⁾	(6)	(5)
Total	(10)	(9)
<i>Clerks²⁾</i> (secretaries, accountants, messengers, a.o.)		
	7	1
<i>Managers⁴⁾</i>		
Retired manager	5	2
		1
Total	120	40

* One of the fitters attended a technical trade school at Kabete for three years, but took masonry. The other fitter had three years training at Kabete and Machakos Technical Schools. He was later a fitter apprentice under the Ministry of Labour craft apprentice programme at this firm for four years. The plumber was trained under the Native Industrial Training Depot at Kabete before the Second World War. And the plumber spent two years learning plumbing and tinsmithing at Machakos Technical School.

Notes:

- 1) 3 are section leaders
- 2) 1 is section leader
- 3) 2 are section leaders
- 4) the distribution between semi-skilled workers and permanent labourers is uncertain
- 5) one is an expatriate, two are Kenyan Asians
- 6) section leaders are counted under skilled and semi-skilled workers
- 7) there is one woman only employed in the firm as a secretary
- 8) four are expatriates, one is Kenyan Asian

The wide range of manufacturing, of designing, moulding, casting and manufacture of proto-types and different vessels etc., requires highly skilled work. As mentioned, there is a somewhat arbitrary dividing line between skilled and semi-skilled work in the company – in fact one gets the impression that some of the highly skilled workers have been grouped with the semi-skilled ones. But altogether approximately 60 pct. of the employees must be considered as skilled workers with many years experience. Another important group within the production workers are the regular labourers. There has been a very low turnover in this group, and through their long attachment to the firm many are able to act as stand-ins for absent machine operators. There is no standard pattern through which the highly qualified workers in a complex engineering workshop have acquired their skills. Yet a generational division is appearing.

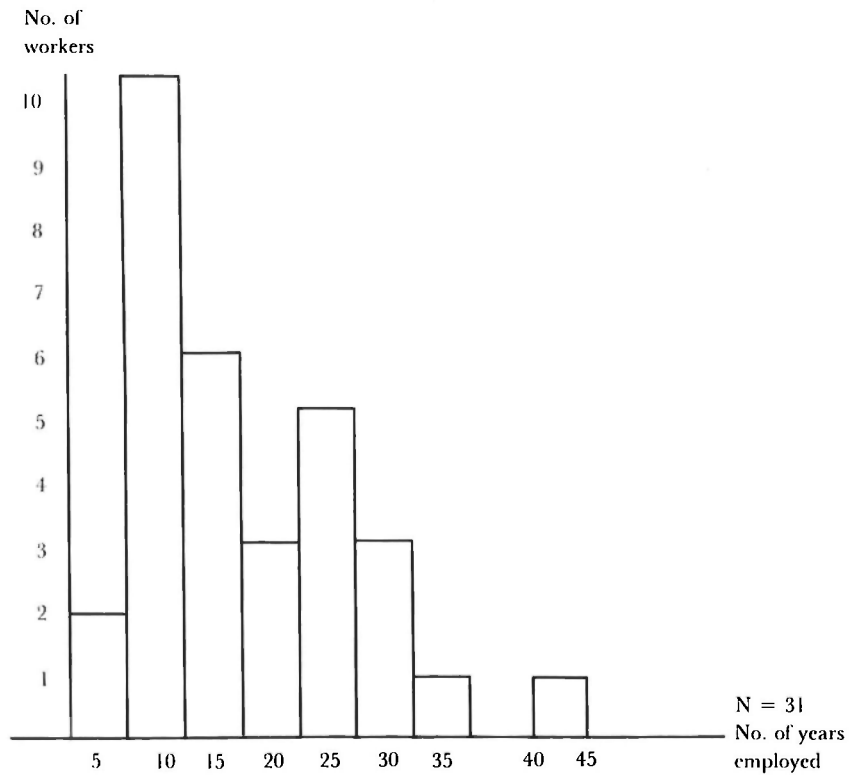
(c) Work and training experiences

In principle a worker can accumulate skills through work experiences, through technical school training or from a combination of these. While technical school training almost by definition is systematic – leading through a succession of stages – on-the-job training can vary from a systematic programme of instructions to learning by trial and error.

Since there is no standard industrial education in Kenya as yet, although the craft and technician apprentice training may develop to be so, there are many possible combinations of systematic instruction and practical work experience through which a person can become a skilled worker.

In the firm there is a wide variety of trades represented, for which the necessary training period is also different. For example it takes more experience to become a qualified moulder or turner than to become a good welder.

Figure 2. Workers distributed according to number of years employed by the firm

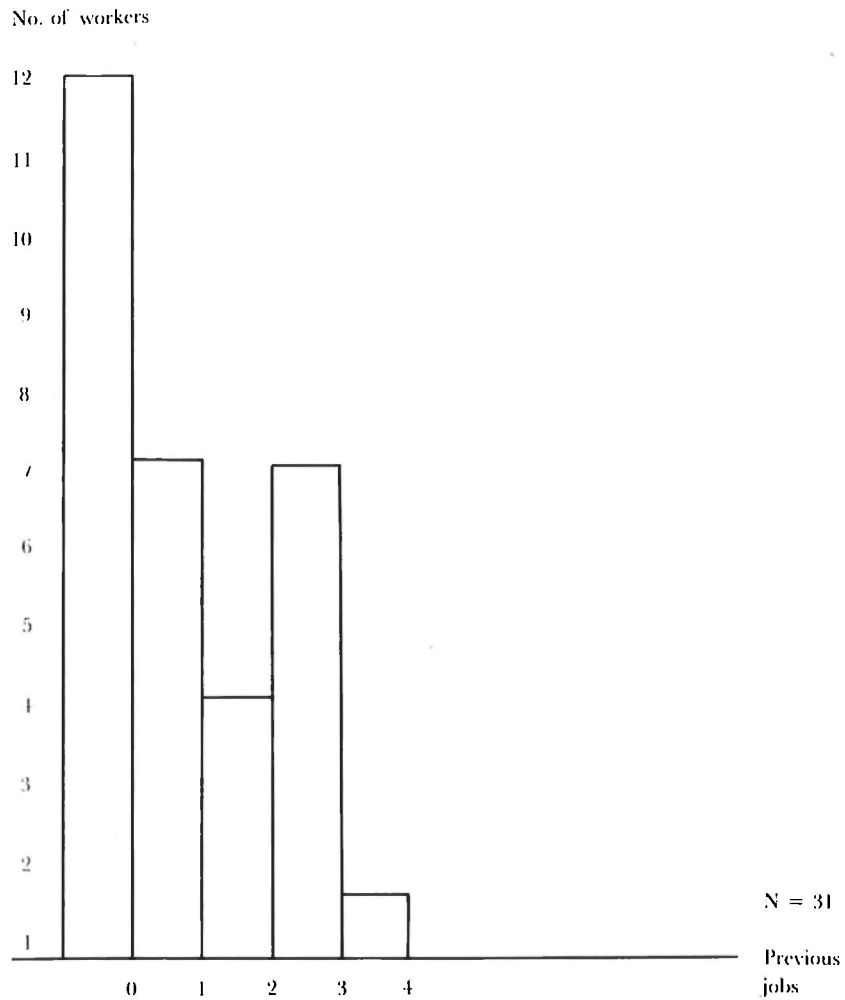


The vast majority of the workers have had their substantial work experiences with this company. A distribution of the 31 production workers interviewed (leaving out 5 apprentices who are all new employees) shows that the average number of years with the firm is 16.

Of the 31 workers only two have been with the firm for less than five years, (both exactly for three years). The large majority have been with the firm for more than 10 years, and two for more than 30 years. It is obvious that this pattern gives the firm a strong basis for influencing its workers' training.

The long attachment of the workers to their present employer leaves room for relatively few previous jobs.

Figure 3. Workers distributed according to number of previous jobs



Thus 12 workers have had no other employment. The maximum number of jobs, held by one worker only, were four.

In our sample the workers are divided almost equally between those who have been learning their trade within this firm and those who have previously been employed in similar or related trades:

Table 3. Acquisition of work experiences in previous or present job

	No. of workers
Previous employment in similar or related trade	13
"Advanced" unskilled work such as storekeeper, administrative police	5
No other previous job	12
	30

Note: 5 apprentices and one chief supervisor are not included.

13 workers already had some experience in their trade or related trade when they were employed. Five had no experience in their trade in their previous jobs, but have experienced wage work. 12 workers had gained all their work experience within the present firm.

The vast majority of the production workers had learnt their trade through practical experience on the job.

This pattern of pure on-the-job training may be changing now. The firm is responding positively to the national training policy by utilizing the training levy-reimbursement system and is continuously employing appren-

Table 4. Training experiences

	No. of workers
On-the-job training only	19
Craft or technician apprentice at the moment	5
Technical school 1 to 2 months	2
Technical trade school 3 years	2
Technical secondary 2-3 years (not completed)	2
Technical secondary and full craft apprenticeship completed	1
Trained in army	1
	32

Note: One storekeeper, one labourer, one chief supervisor who is an engineer, and one foreman with a higher diploma in mechanical engineering are not included.

tices. In April 1981 there were 12 apprentices. It is, however, interesting to see that this does not necessarily affect the structure of the labour force directly. Thus, in our sample we found only one worker, who had been sponsored by the firm for 4 years apprenticeship under the Ministry of Labour Programme, and who had stayed on with the firm.

One explanation is that apprentices on completion of their training are free to seek other employment, and many will look for better paid jobs than what they can expect in this firm. But, of course, the company is similarly freed of contractual obligation on completion of an apprenticeship contract, and may not put any efforts into keeping apprentices who do not live up to the firm's expectations.

Another indication of the change away from on-the-job training only, lies in the Kenyanization of the engineering trades. A familiar training pattern in the Asian owned engineering firms has been to pass on skills directly from the older men to young family workers. African employees have largely been used as labourers in these firms, but have not benefited much from the in-family training tradition (K. King 1977). With the reduction of the Asian community, this training pattern has also been waning, while those who are left take a somewhat different attitude to training. Thus today, it is a familiar pattern, that engineering workers of Asian origin are sent abroad, very often to India, to be trained in technical institutes there. This has been the experience of one of the foremen of Asian origin in this company. The firm employs only one production worker of Asian origin – an old turner who has been with the firm for 43 years. He comes from a typical background of long-standing craft traditions.

Skill transfer from older to younger workers among Kenyan Africans is generally confined to the work-place. Here it is in fact central in training on-the-job. Very few firms have specialized training personnel. Most rely on more experienced workers for instruction purposes.

It is only recently that the disadvantages the African workers have had with regard to training are beginning to disappear. With the need to train Africans to take over after Asian craftsmen, with the expansion of technical schools from the mid-1970s and due to a popular pressure to open technical training opportunities for school leavers, the pattern is slowly changing. However one cannot shift in a short timespan from a cultural pattern which is largely devoid of technical appliances to one in which technical know-how is woven into the social network, familiarizing its members with all sorts of techniques from early childhood. The idea is not to advocate a

“technified” society, but to illustrate how different cultural backgrounds create different learning patterns.

Features of change in labour recruitment, turnover and training practices

(a) Recruitment

Up till 1986 when 80–90 pct. of the skilled workers were Asians, there was very little turnover. Many had stayed with the company for 30–40 years. Skilled workers were therefore mainly recruited through promotion internally in the company.

Since the introduction of the training levy system, the company has tried to keep strictly to Form IV Secondary School leavers. There is now a bigger and better selection of these, but the company still finds it difficult to keep the good ones. Not all new recruits can be taken from secondary schools.

A number of workers come with work experience from other engineering firms, often small ones. The work experience they have gained are considered of much higher value than whatever paper qualifications they may have. Some come with a certificate of training – but they start with a probation period until they have proved their capability.

School certificates have never been taken as a guarantee of a person being able to do what it states. The criteria guiding the selection of new workers, when these are not apprentices are: practical tests, probation period and payment according to capability – irrespective of formal qualifications. An eye is also kept on a job applicant’s school subjects and results. Credits in math and science and good knowledge of English are preferred.

There is general agreement among management and foremen that there are more better-qualified applicants for production jobs today than 5–10 years ago. Also the quality of recruits of a particular education is considered to be higher today. The situation is described in the following words by one of the managers:

“On one hand it is a question of better education, but what is even more important, the bringing up is improving all the time. It means that the youngsters who enter the labour market have a better understanding of what they are doing. They are brought up in homes today where fathers have better positions. The up-bringing means the whole difference. For

example, in 1965 when we started to get trainees to the National Industrial and Vocational Training Centre we could not make sense of them, although they were supposed to get training in engineering trades. Just five years later the situation was much better. These days the ITC trainees are quite good”.

If this statement is cross-checked with observations on “father’s position” we find a rather differentiated pattern. A majority of the workers come from families where the father had wage work of some kind or own his business:

<i>Father's position</i>	<i>No. of workers</i>
Peasant/farmer	7
State employee	7
Businessman	5
Teacher, priest, traditional doctor	4
Craftsman	3
Farm labourer	3
None	4
	33

Expectations that industrial workers are primarily first generation wage workers is clearly not fully confirmed from this sample. That 7 workers only come from a background where the father’s primary work is farming, does not necessarily imply that the rest had fathers with “better positions”. What it does mean, however, is that socially and culturally the background of these workers is more differentiated than first expected.

(b) Labour turnover

The long attachment of the production workers to this firm was discussed above. Labour turnover, therefore, is not a general problem. It is very slight among semi-skilled and unskilled workers. “The higher the skills, the higher the turnover”, the production manager claims. It was very bad in the mid-seventies but tends to be less so with the recession. For the

higher skill levels labour turnover is said to be definitely too high. Thus, there is a high rotation among die makers, bench fitters and millers. The explanation given is this:

“Being a production firm in which labour costs are included directly in product prices, the weight of labour cost must continuously be kept down. In large companies, where skilled engineering workers may be a small minority, in maintenance work only, it is different. Such companies tend to be able to pay higher wages and to pick up our better workers. Our company does offer increments to counteract labour turnover of skilled workers. However, we found that it does not solve the problem, it only delays it. The workers will skip after a while anyway. The increment is therefore not of much value”.

The firm avails itself of other means than pay incentives to keep down labour turnover among workers with critical skills. Training procedures seem to be a favoured method in the company where job-specific training is still the dominant approach despite some experimentation with the public general training programmes.

(c) Training practices

Today's skilled African workers have in many cases been trained by the company's Asian workers. Contrary to what King found in the informal sector, where African workers were generally prevented from learning systematically from their Asian counterparts, the learning procedure would normally be that a learner followed an Asian 'fundi'. He would be a mate or an assistant to him and learn from observation and advice. The brighter of them would stay on and gradually be given more work by the 'fundi' and so gradually learn the job. Some of the better ones have left the firm again.

Despite positive statements that public training programmes have been improving, there is far from full satisfaction with the training programmes offered by the Ministry of Labour. The institutions to which the apprentices have been sent are the Industrial Training Centres and Kenya Polytechnic.

The company has tried the *Technician Apprentice Programme* several times, but it has not been very successful. For two trainees the company had diffi-

culty in finding the relevant courses at the NIVTC and the Polytechnic, since there were too few trainees to run a course for. A third technician trainee dropped out.

The company has been running the *apprentice training for craftsmen* since the early 1970s, when the Ministry of Labour started these programmes. Approximately 4 apprentices were taken in every year for 3–4 year courses.

Very few of them completed. Their desire was to continue with technician training and a number left to obtain that elsewhere. Others would try to get back into further education of Form V and VI.

The *indentured learner training* has never materialized in DIT. It would be of shorter duration than the 3–4 year craft apprentice programme and is considered by the management to be more handy and suitable for many categories of semi-skilled workers.

Management's expectations of the planned Modules of Employable Skills (MES) training as an alternative are high.

Compensation through *skill-improvement courses* has not been possible either. Semi-skilled workers were previously sent for skill-improvement courses. But not for a few years now, since the company was not satisfied with the results. For example a worker was sent for gas-welding training, but he came out as an arch-welder. Also management has been very reluctant to release people for training in general. The explanation being that a skilled person would be needed but unavailable while he was gone for training. Secondly, that "many would chose to leave after we have spent energy on training them".

In addition to the standardized apprentice training schemes now being commonly used, the former manager has carried out comparisons between different training systems. He states:

"Two chaps were taken on at the same time. One had academic secondary school background. He was sent for an ordinary diploma mechanical engineering course – with the intention to let him continue for higher diploma. The other chap was a technical secondary school leaver taken on for technician apprentice training to go through the Polytechnic. At first the technical chap was more popular with the firm. But now the academic chap has superseded him after he has caught up on the practical experience".

The firm has changed management since this experiment was made and it

is doubtful whether similar experiments will be made in future recruitment and training practices.

The current personnel policy is to focus training inputs on supervisors. There seems to be no basic changes in the overall training policy of production workers:

“For our firm it is more practical with on-the-job training. This is up to craft-level where practical experience is most important. Technicians, however, do need to have more theory than craftsmen.

Generally there is a tendency for craft apprentices to want to become technicians. Their second choice if you ask them is that they want to be turners since that is one of the better paying crafts. In fact they want to become professional students.

We are not big enough to run our own training school or to have a full-time training master. Compared to Metal Box which has its own training school, we are diminutive. And the poaching problem affects our training practices and our interest in formalising it, since we cannot keep the workers after, sometimes not even all the way through their training period. So we cannot take full advantage of the Government’s training system”.

To sum up on the company’s training practices the following points can be made:

- The shift away from pure on-the-job training towards more formal training has been quite problematic. Informal on-the-job training remains the dominant mode of training. Management still views its attempts to use public training programmes as an experiment.
- Experiences gained through experimentation with Ministry of Labour’s general training system has not been very positive. An inclination to let on-the-job training, combined with short-term courses, dominate in the future can be expected.
- With the expected concentration on supervisor training the capacity to instruct production workers on the job may be improved. The inclination to concentrate on on-the-job training may be further strengthened.
- Management complains about the relevance and quality of apprentice training, although the Industrial Training Centres are said to have im-

- proved. There is a general feeling, in the firm, that shorter training courses for production workers would be more relevant to this company. Experiences with skill-improvement courses alone do not confirm this.
- The company's motivation for recruiting apprentices seems to be based on utilization of the training levy/reimbursement system rather than on the function of apprentice training to satisfy the firm's need for specific labour skills.
 - For some time to come there will be two 'breeds' of production workers in the company: A majority trained on the job, and new workers recruited from technical schools and undergoing 4-5 year apprentice training courses.
 - It is to be expected that there will be a high turnover of apprentices since their skills are more general and applicable in different companies and since a number of the apprentices will attempt to continue with training and further education rather than with production work.

Labour relations

(a) Wages

(i) Wages and training

There is no clear indication of the effect of technical school training on a person's job performance. Our sample of workers who have attended technical schools for more than two years (excluding 5 apprentices), is too small for far fetched generalizations. From management we know that a worker's wage (if it exceeds the statutory minimum) normally is determined by the quality of his job performance and not by any formal criteria. Increments on wages are being used in cases where management suspects that an indispensable worker is planning to leave the firm.

The four production workers with more than two years technical school earn on average 1573 K. Shs. per month. This is a wage well above the average for all the production workers interviewed, which is 1250 K. Shs. Workers with on-the-job-experience only, on the other hand, earn on an average only 1114 K. Shs. per month. This may be taken as an indication that their job performance is related positively to previous training.

For apprentices, the wage is not necessarily an indication of the quality of their job-performance. According to the Industrial Training Act of

Kenya, apprentices' monthly wage is set as a percentage of a fully skilled worker's wage. (Appendix A). This falls out well above the average for the production workers in the firm (1259 K. Shs) at 1426 K. Shs. per month, for the 5 apprentices.

Figures indicate technical school training correlates positively with higher wages, which in this firm should be an indication of "better job performance" or with "indispensable skilled workmanship" – not any standard job classification. There is no similar positive relationship between wages and general schooling.

(ii) Wage structure

According to the agreement between the Engineering and Allied Industries Employers' Association and the Kenya Engineering Workers' Union, KEWU, about Terms and Conditions of Employment, permanent employees in production are classified in eight groups. In principle a complex job evaluation consisting of 12 factors such as education, experience, responsibility, mental effort, skill, etc. determine an individual worker's posting to any of the 8 groups. On September 1st, 1979 (effective for at least one year ahead), the consolidated wage rates varied from 722,60 K. Shs. for group 8 workers to 1347,70 K. Shs. per month for group 1 workers.

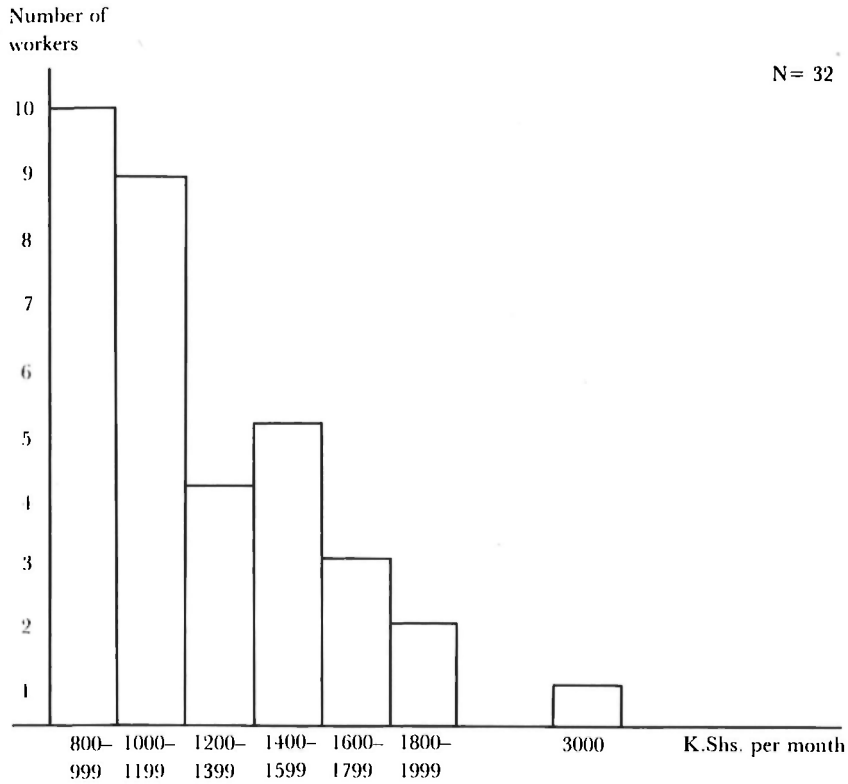
In reality the eight grades job classification is not followed, as might be expected. Compared to the actual monthly wages many workers seem to be better off without a strict adherence to job-classification.

Under normal circumstances the agreement would be in force for two years until that date "whereafter it continues in force indefinitely until either party by the giving of three months' notice in writing signifying a wish to amend or terminate the Agreement". Unfortunately for the workers, who are organized in the conflict-ridden KEWU, the delay of the general elections in that union has delayed the amendment – and wage regulation – of the agreement.

If we assume that there has been an increase in the consolidated wages from 1979 to 1980 not less than the 7 pct. increase from 1978 to 1979, a group 8 wage should be equivalent to 773,20 K. Shs. per month and a group 1 wage equivalent to 1442,05 K. Shs. per month in March 1981.

Figure 4 shows that all workers are paid above these consolidated wage rates, if some only slightly. But the majority of the workers cluster around

Figure 4. Wage structure for production workers, March 1981



Note: The four supervisors are not included.

the lower pay-scales, 9 workers earning less than 1000 K. Shs. per month and 17 workers earning less than 1200 K. Shs.

Wage increments may be used to keep "elite" workers within the firm. However, the increments are kept within a rather limited range. The wage level has not risen beyond 2000 K. Shs. per month for individual workers (with the exception of the one "specialist" turner with 43 years of employment in the firm).

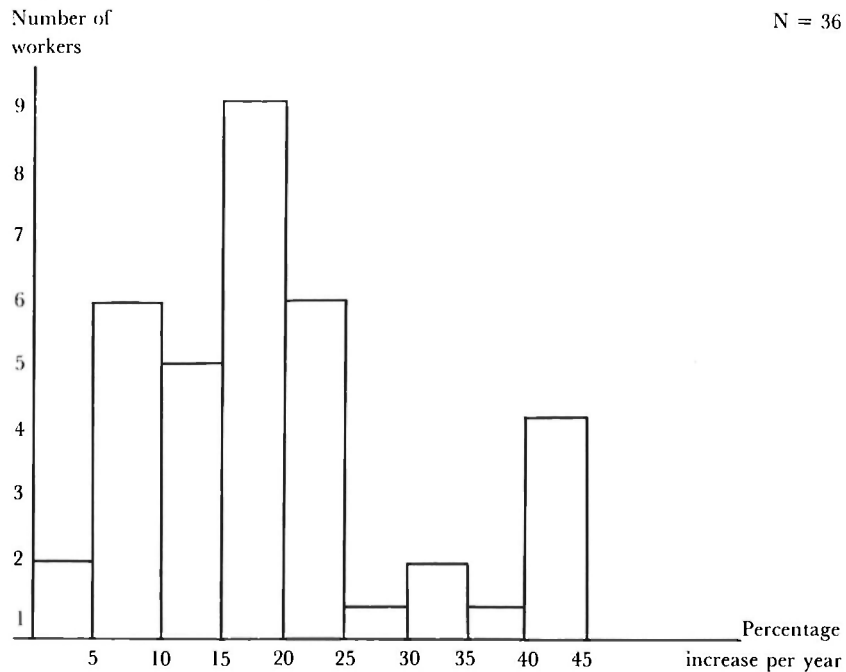
There is no mechanism by which the workers are informed about productivity levels in the company. Their possibility of producing arguments for wage regulations based on productivity-wage relationships is thus lim-

ited. For Kenya Engineering Workers' Union the recession weakens the ground for demanding better terms and conditions for their members, and their claims can be further weakened by arguments like, "workers rely on support from their shambas".

(iii) Real wages

There is an extremely uneven distribution of the average annual wage increases. Two workers had annual pay rises below the 7 pct. average for the consolidated wage increases. Excluding the five apprentices, with fixed annual wage increases the overall average increase for the workers was 15 pct. per year. However, the variation is very large, with some workers hav-

Figure 5. Estimated average annual wage increase of interviewed workers in the 1970s



Note: All interviewed are included here. The category: 41-pct.-and-over wage increase per month includes two who had a 47 pct. average annual wage increase, one who had a 70 pct. increase per year on average, and one having a 131 pct. annual wage increase. The period covered is primarily the 1970s but varies somewhat according to the individual's first employment year.

ing done very well, and a number increasing their wages only slightly above the consolidated wage rates. The foremen-group did best – their annual wages rising between 35 and 131 pct.

The real meaning of these figures of course only stand out when they are compared with the rise in consumer prices. Here we find that the Lower Income Index⁵ of consumer prices for all consumer groups (Nairobi area) rose by 17 pct. from 100 in 1975 (June) to 191.8 in January 1981 (*Monthly Statistical Digest*, February 1981).

For the Middle Income Index the average weighted index for all groups was 169.5 in January 1981, making an average increase of 13 pct. per year.

Consumer prices have thus been growing much faster than the consolidated wage increases of 7 pct. for engineering workers. And, it is the lower income groups – who are both more liable to be paid the basic minimum wage only, and for whom price increases have been the highest (17 pct.) – who are the hardest hit wage income group in the city.

All labourers and casuals in this firm can confirm this bleak development, while the workers in our sample – being skilled and semi-skilled – belong to the middle income group. *On average*, these workers' wages seem to have kept pace with the price increases of 13 pct. But the workers who have not improved their wages as fast as price increases – and there are several even in the middle income group – are facing severe problems. The frequent complaints about soaring rent, transport costs and food prices are based on the worker family's bitter experience.

What is more, there is no possibility for making up any loss in real wages through fringe benefits, since the collective agreement between employers and workers in engineering industries is a bare wage agreement excluding fringe benefits. In comparison with some other trade groups, housing allowance for example, is included in the wages.

To get a full picture of the workers' incomes and standards of living, it is necessary to get an idea of their ties to the land and alternative income sources. Taking the workers' obligations towards dependants into account, puts the workers' social situation into a broader perspective.

5. A Lower Income household is defined to be one with an income of up to K.Shs. 699/- per month. A middle income household is defined to be one with an income of between K.Shs. 700 and K.Shs. 2.499 per month. Def. *Statistical Abstract 1980*.

(b) Trade union organization

The organizational level among the workers here is high. Among the 28 unionizable workers interviewed, 24 are members of the Kenya Engineering Workers' Union. Unionization, of course, is not necessarily equivalent to a high degree of trade union consciousness. In a system where union membership fee (for KEWU 8 K. Shs. per month) is automatically deducted from monthly wages, a worker may be enrolled more or less automatically without his enthusiastic support. It seems however that there is a general trade union consciousness among the workers.

That management keeps an eye on workers' trade union activity is borne out by statements from a former shop steward. After a meeting with KEWU's branch secretary about conditions of work, he was disciplined by the manager. He decided to resign as shop steward and from the union in order not to lose his job. Labour relations have been handled directly at the firm through consultations between management and the shop stewards for years. Excerpts from minutes of meetings between the shop stewards and the manager from 1965 onwards indicate, that "big and "small" issues are discussed. Small issues often taking up major time in the consultations. Thus, over a 5-year period, the issue of "free tea" appears time and again.

There are three characteristic features in how labour relations are handled at company level:

1) The tendency for minor topics to become central issues in successive meetings; 2) a detailed level of argumentation by the shop stewards on behalf of all workers, but in particular workers in the most inferior positions, and 3) the power of the employer to postpone decisions but to use minor benefits (the cost to the company of the solution to the "free tea" asked for by the shop stewards was 150 K. Shs. per month) as a carrot – thus waving off more vital issues. This is not to suggest that issues of more vital interest to the workers are avoided. The following topics were dealt with in consecutive meetings:

(i) Finishing time

Management complains that employees get ready to leave work 10–15 min. before time is up. The shop stewards request that the company puts up a notice to inform the men that any man found continuing this practice

should have his wages cut for a quarter of an hour and if he was caught again that he should be dismissed.

(ii) Prospects for Africans and Asians to be the same

Shop stewards complain that newly employed Asians are allowed to operate machines immediately after joining the company. In the case of Africans this was not allowed and the result was that the Asians stood a better chance of promotion than the Africans.

The shop stewards note that the company employs a good number of well qualified and reasonably well paid craftsmen: turner, guillotine operator, press brake operator, and welders; and some Africans are receiving practical experience as fitters, blacksmiths and moulders. However, they are of the firm belief that there are no Grade I African artisans, whereas a great number of Asians not only receive Grade I wages, but a fairly large group receives wages considerably higher than the minimum for Grade I. They request that Africans soon be found in the same categories.

(iii) Training

Shop stewards request that tinsmiths be gradually trained to do sheet metal work since there is insufficient work for tinsmiths. They note that most of the sheet metal workers have undergone training as tinsmiths, and they feel, therefore, that the tinsmiths could be trained to do sheet metal work without any great expense to the company. Management answers, that the only way the company could bring about such training is for each tinsmith to study under one of the sheet metal workers, which will result in a doubling of the labour costs for each job. It is rejected.

(iv) Recognition of government trade tests

On request the shop stewards are informed that the company recognizes the three grades of certificates issued by the Government Trade Testing Centre and pays wages accordingly. They are, however, asked to bear in mind that workers who may be able to perform to a Grade II standard have been found to be very, very slow. The shop stewards agree that this appears to be the case, and they refrain from making further claims.

(v) Wage increases

Shop stewards observe, that a number of artisans, particularly in Group 3, are on the minimum wage for the Group and have been for a number of years, while new employees, with the requisite qualifications, are employed at the same rate. The shop stewards maintain that men of longer service are bound to be able to do their work more quickly. They are informed that the rate for the job applies and therefore it is quite possible for men of long service to be on the same rate as new men doing the same work. Individual results are shown on job cards. No further comments.

(vi) Training scheme

The shop stewards are informed that two foremen will institute a small training scheme. They will select about six suitable employees, and will give short lectures on evenings when overtime is not being carried out. The lectures will cover simple technical drawing. Those selected must have sufficient education and enthusiasm, judged by the foremen. It is upon these men to make the decision as to whether the scheme shall continue or not. The shop stewards give the idea much backing.

(vii) Working hours/days per week

Shop stewards state that the men would like to go over to a five day week, still maintaining 45 hours per week. Although management does not consider this a matter for negotiation the company comments on the request in the negative for the following reasons:

- The amount and frequent urgency of repair work precludes having Saturday off.
- It has been found by other companies that an increase in absenteeism results, as men try to go home for the week-end and then find themselves unable to get to work on Monday on time.
- Experience from long periods of overtime in the company has shown that a 9 hour day is too long and results in 8 hours work being performed in 9 hours. This is particularly true with regard to older men and men working on jobs where a high degree of accuracy must be maintained. The topic is discussed at consecutive meetings.

Other topics – if some minor – that have been brought up at these consultative meetings, for which shop stewards have prepared the agendas, are:

- *Personal Accident Insurance*: The company is requested to take out a policy against industrial accidents for the individual employee so that they will not lose half their pay when accidents occur. Investigations are promised.
- Information that Government has issued erroneous statements about each employee's account with the *National Social Security Fund*. The company has corrected and returned the statements.
- Requests for the company's assistance in pressing the City Council for *housing accommodation*.
- Complaints about *unfair treatment by foremen*.
- *Discrimination of Africans*. Many examples are provided by the shop stewards that management and foremen discriminate against African workers while favouring Asian workers.
- Request for *job classification review*.
- Requests for reasonable procedures for staff *telephone calls*.
- Complaints about *hygiene in lavatories*.
- Request by shop stewards for *overtime work in lieu of a Saturday following a public holiday*. The request is not being met by management.

Of the quoted topics that have been discussed at meetings between management and shop stewards, several are in fact non-negotiable at company level. Management has not been hesitant to point this out when shop stewards have brought up such matters. Other grievances are localized cases, but the general impression is that the function of these meetings is first of all to take the "steam off the kettle". I.e. workers get a chance to air their grievances, management is informed about whatever frustrations are boiling at the shop floor, and management channels its "clarifying information" to workers through the shop stewards. The meetings are for consultations and rarely result in decisions on practical matters.

(c) Job satisfaction

It is difficult of course to quantify the effect of consultations between shop stewards and management, but it is likely that they contribute to a peaceful atmosphere in the company. An indication of this is that there have

been no major disputes in the company. A sympathy strike in 1970 of short duration is not counted as a local grievance.

This does not mean that workers are unconditionally content with all prevailing conditions. One third of the workers are aware that the trade union has its stake to play and could do more to help improve their conditions. A typical suggestion is that the trade union could do more to help improve workers' wages and other generally negotiable conditions of work such as house allowances, transport to work allowances, better leave allowances, free medical treatment with private doctors, free protective clothing and overalls every year – conditions which are not generally included in the agreement, since it is a pure wage agreement. A few workers see the role of the trade union to include struggling for the social rights of the workers including access to canteens, sports and cultural activities.

The high job-stability of workers in the firm – the average period of employment being 16 years! – is not an automatic indication of job satisfaction as one might assume on first impression.

A test of the workers' "job-satisfaction" can be approximated in various ways. Thus for example, one third (12 persons) of the workers were of the opinion that they were put in job positions for which they were over-qualified. I.e. a few of the workers were sure that their skills qualify them for other technical and better jobs than the ones they are performing. Some of the "misplaced" workers were of the opinion that they were qualified for supervisory/instructor jobs.

Generally the workers are not satisfied with their present skill levels. One third (12 persons) express a desire for further training. It is the workers who have some previous formal training who recognize a need for further training. This is expressed very clearly by one of the workers: "When you are trained only on the job you do not develop yourself. You will not be qualified to understand new technologies or changes. It is only your employer who gets the benefit, since you are capable of doing a very specific job only".

Asked directly if they are satisfied with their present work no less than 20 answer that they are not. And even among the 16 who are satisfied with their present work, three immediately add that their job satisfaction is conditioned by the fact that they see no other choice than staying and accepting their work. Some (6 people) are fully convinced that they do not want to stay on in this firm.

While the stability of the work force supports the assumption of a high

degree of job satisfaction, the shallowness of that assumption becomes even clearer when it is realized that half of the workers have been thinking of changing job and leave the firm. It is a general belief among the workers that other firms pay better wages. Half of the workers have considered job change in order to get better pay.

Among the workers who want to change jobs there is a small group (5 people) who would quit in order to start their own business and "become their own boss". The jobs which the workers have in mind as substitutes to their present jobs are generally jobs for which they do not consider further training to be necessary.

Whether job changes materialize or not does of course depend on different circumstances: the likelihood of finding vacant and better paid jobs in the job market, the marketability of a worker's particular skills, the worker's age, his ability to accumulate whatever resources are necessary to start on his own, in addition to his technical skill, etc. But also the firm's ability to control a worker's skills plays a role.

For example this firm is characterized by offering broad-skill jobs. However, some workers are "trapped" in the firm by being tied to a certain machine. This is the case for a fitter at one of the drilling machines. As his foreman says: "There are some workers who will never have another place to go. For example Mr. O. will never be able to find another job, since there are 2-3 similar machines only in the country". The man is trained specifically for this firm. His chances of promotion are minimal and at the same time he feels his job extremely monotonous. Not unexpectedly he expresses severe frustration about his job and the firm.

To conclude - job satisfaction is not as absolute as one might assume on the basis of job stability alone. We have questioned this assumption of job satisfaction by indicating the feelings of "misplacement" with regard to skill, and the desire to change job. This is of course not a complete picture. A fuller picture of job satisfaction would have to consider trends in the economy which affect the labour market for metal workers. In periods of recession and stagnation job changes are more difficult to accomplish while job rotation within a workshop may be practised in order to maximize the skill structure of the work force. Obviously the general feeling of "misplacement" and desire for job changes in this firm also reflect that margins have narrowed in the labour market for most metal manufacturing skills. Although certain skilled workers such as bench fitters, die makers and millers are in high demand, for the general metal worker to express

a desire for a better paid job is by no means the same as his chance of finding the job. It is not so much that workers' skills do not meet particular demands from industry. But industry also tends to organize the labour process according to the labour force already available.

Social situation of the workers

The means to increase the income of permanent workers with a working week of 45 hours are of course not many. The possibilities open are roughly overtime work and earnings from landholdings, while supplementary incomes from family members certainly also ease the workers' burden of responsibility.

(i) Overtime-work

A very large proportion of the workers supplement their incomes with frequent overtime work. Only five workers did not work overtime as a way of supplementing their incomes.

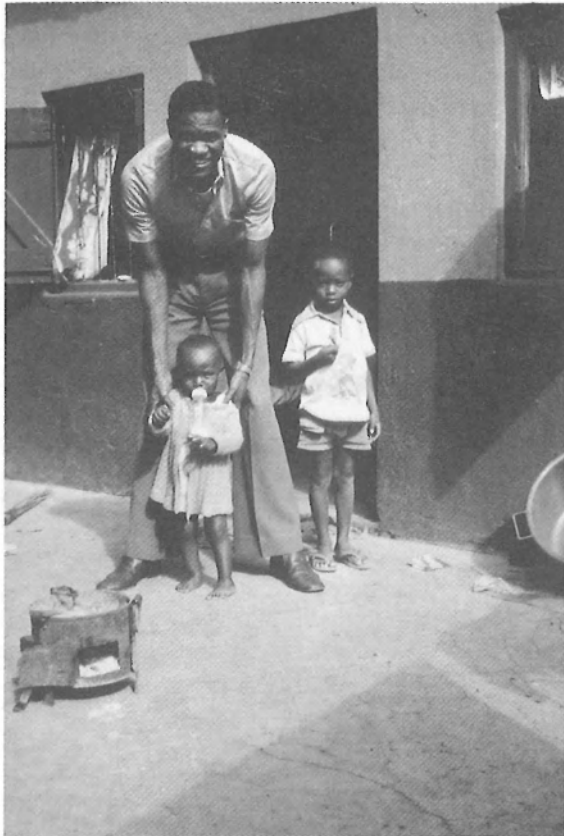
Though management does complain that workers' productivity correlates negatively with overtime-hours, this argument cannot be taken too seriously as long as the firm maintains a minimum labour force which is continuously forced to work overtime to complete urgent work.

In a society where unemployment is so extensive this tendency in private industry for a disproportionate amount of overtime work certainly exaggerates the need for more jobs. One cannot blame the worker who is in need of cash and who gets 1½ times normal hourly wage rates for overtime work for being willing to do extra hours frequently. From the worker's point of view it can be a necessary step to maintain his real income. From a distributional point of view the consequences are unfortunate.

(ii) Earnings from landholdings

A second possible extra source of income is earnings from a piece of land. Very few indeed do have incomes from selling surpluses off their land. Only three have sold surpluses the previous year in the range of 500 K. Shs. One single person, earning about 7.000 K. Shs. off his father's land.

This does not mean that other workers have broken ties with the land. On the contrary. Only three production workers (and four apprentices)



*Metal worker's
urban home.*

have no land at all, while 6 mention that they do not yet have their own shamba but will at some stage inherit part of their father's land. For the great majority of the workers, what is grown on their land is for the family's own consumption.

There are big variations in the intensity of land utilization among the workers and similarly great variations in the plot sizes, these varying in size from 2 to 30 acres, with an average plot of 8.5 acres. If these figures are correct it certainly does mean that the level of productivity on these plots is very low, considering that only three plots produced a marketable surplus the year before. A very frequent explanation given by many of the workers for this low output is the drought the year before, while in normal years several more would have been selling surpluses.

The low level of productivity may have other explanations, among them insufficient farm management. Few of the respondents manage their plots themselves or take the main responsibility for decisions on land utilization, cattle breeding etc., and fewer even participate in working their land themselves.

A breakdown in *main responsibility for management of the worker's plot*:

Wife:	13
Worker himself:	6
Father and/or mother:	6

shows the high frequency of wife-managers. But not only do workers' wives



Rural home.

take responsibility for organizing work on the family plot. To a large extent work is carried out by women and children.

A breakdown into *groups who do the work on the worker's land* is as follows:

Wife and children:	12
Hired labourer:	5
Wife in cooperation with other relatives, labourer, and worker himself	4
Other relatives	4

With this high frequency of family/wife labour on the land it is no surprise that only a few wives have wage incomes.

(iii) Supplementary incomes from family members

It is difficult to get a full picture of the overall economic situation of the workers' families, which often include not only wife and children but brothers, sisters, parents, cousins and sometimes parents-in-law.

Though the dependency rate clearly varies, responsibility for 7–12 dependents is frequent. But in addition to this, half of the workers count others whom they occasionally support, typically between 2–6 people.

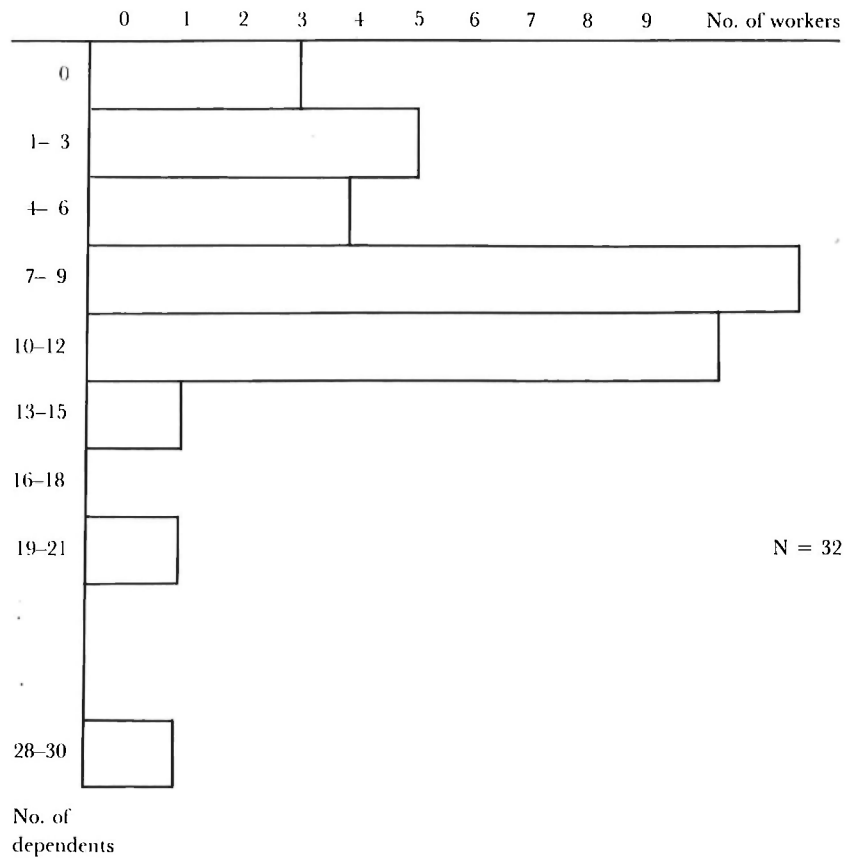
In relation to the high dependency burden, contributions to the family's subsistence from other relatives are important. The high number of wives working on landholdings have already been mentioned. The yields from this work is the most important supplement to the worker family's subsistence. Other family members may contribute wages or other cash incomes to the dependents of the workers.

Only three wives in this sample have their own cash-incomes – two from wage work, one from small business.

Only 17 workers have additional assistance from other family members. The majority of these have only one or two others with whom to share the burden.

To sum up, there is a clear element of migrant work among the permanent workers in this company. Many must be counted as permanent migrant workers having lived as single in town for many years. Double family households is another feature. There is a high dependency rate which is

Figure 6. Number of primary dependents



taken care of by the workers' income supplemented with subsistence production – carried out by the wives and children. Incomes from sale of surplus production is very limited. Very few wives have cash incomes, but other relatives – brothers, parents, children, sisters, and cousins – do to some extent assist in supporting the workers' dependents.

(iv) Family structure and housing

There is a high frequency in this company of split families, where women

and children live out of town on the family land or – in some cases – with relatives.

No less than 50 pct. of the production workers live as single in town in a rented room. To this group belong one worker who has 3 wives and 14 children, all living out of town, and 2 workers each married to two women who together with their children have remained in the countryside.

Just over one fourth of the married men have more than one wife. Most of them stay with one wife and some children in town.

The following breakdown gives some indication of the *housing situation*:

	<i>Number of Workers</i>
1 person living in a single rented room	15
2 persons sharing a single rented room	7
3 persons sharing a single rented room	1
4-5 persons sharing a single rented room	2
3-7 persons living together in a privately owned house	2
4-7 persons living together in a rented house	4
living in hostel	1
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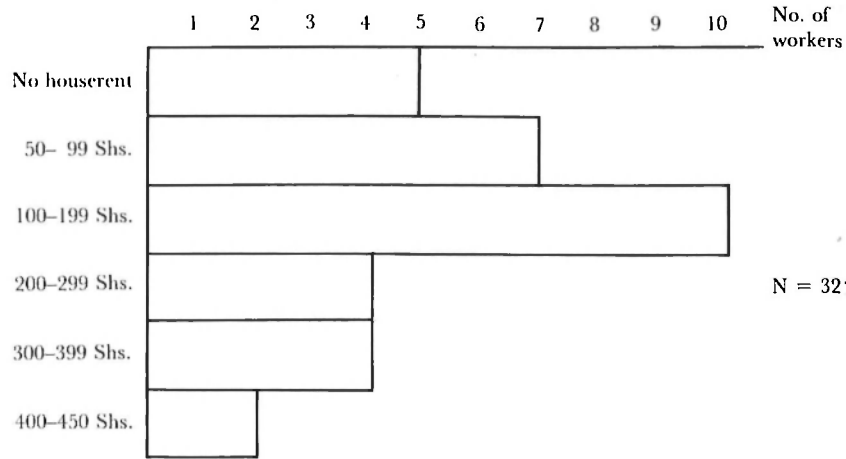
Concerning the standard of accomodation, information is limited. However, several live in rooms without electricity and water. An indirect indication of the standard of the rooms in which many of the workers live is contained in information about the monthly house-rent.

Compared with the often exorbitant house-rents in the areas and estates from where the workers come – e.g. Kariobangi, Shaurio Moyo, Kibera, Eastlands, Kamukunji, Jericho, Pumwani, Mariakani – these are at the lower end, clustering around 200 K. Shs. per month. What these comparatively low house rents, however, may indicate is that the standard of the rooms is indeed very low if we make exception for the few who live in self-contained, rented or privately owned houses.

(v) Savings

From what has been said so far about incomes and long working hours, de-

Figure 7. Monthly house rent paid by the worker



pendency obligations, family structure, and housing it is hardly surprising to find that few workers are able to save from their earnings. 20 frankly state that they can make no savings at all. 12 do make monthly or occasional savings, but the amounts are very small – 8 are saving less than 100 K. Shs. per month. The maximum being saved is 273 K. Shs. per month by one worker. The situation is rather the opposite that workers off and on are unable to meet their regular, or have unforeseen, expenses and are forced to take loans, if loans are available, or to get an advance on wages. Both alternatives have been practised a lot in this company. But excessive need for frequent loans has made management stop this practice recently.

Conclusion

The general impression which the analysis of this one engineering company leaves is that of a well-established enterprise with a stable and competent labour force. The company has not been untouched by the recession but some production and organization rearrangements have been introduced to wave off the worst problems. And still it is obvious that beneath the surface of a well functioning company there are a number of problems involved in improving industrial workmanship in a developing country

like Kenya. What at first sight stands out as characteristics and problems unique for this company and its workers proves to be a more fundamental and structural nature. Thus, the development of industrial workmanship is more than a technical question of correct training for particular jobs, for particular machine operations etc. It is fundamentally a social problem exaggerated by economic forces in the present context of industrial development in Kenya. The point is in many ways confirmed by the production manager's analysis of the situation:

“Regarding the technical skills and training needs, the workers are sufficiently equipped when they come from colleges and technical schools to adjust to our production. Many of our workers have fantastic skills, but the majority are slow, forgetful, and reluctant to act on their own. It is fundamentally a problem of motivation. Productivity would definitely increase if people were given incentives. But the incentives to put an effort into the work are completely missing for these guys, whose wages cannot possibly maintain them and their families. When people don't have their basics covered there are no incentives. If they don't have a shamba, how can they possibly survive on the small wages? They are in fact so plagued with worries that it seriously affects their working capacity. It comes to the situation where a person stands here crying telling me about a dead relative and why he must therefore have a loan. At the rate relatives die, the population in Africa after my calculation should be decreasing! It is a humiliating situation for a person having to put himself in such a situation.

Just an example: On Monday – three days after they had been paid, I had 25 men here asking for loans from 50 – 300 Shs. And mind you, we are the best paying engineering firm in Nairobi. (Most likely an exaggeration, but the points are valid anyway – BM). We have now stopped the loan practice from this month. Administratively it ran out of our hands. And it is so difficult for the fellows to pay back the loans that in fact I am doing them a disfavour supplying them with loans for which we have to deduct from their wage for the next 2–3 years.

In principle the workers are paid monthly but everybody needs advances after 2 weeks, so they are in fact paid fortnightly. I have suggested to them that they be paid weekly, but the workers objected strongly. ‘How can we then pay our house rent’ was their complaint.

Engineering is only a tiny bit of the problem of industrial workers. As an engineer I tend to look at the technical aspects, but in fact the social problems dominate other problems.”

The analysis of workmanship in this well established company has concentrated on craftsmen with artisan skills in the more secure jobs. However privileged, relative to the majority of Kenyan labourers – not to mention peasants – there is a need to caution against quick conclusions about the advantages of skilled workers.

Company 2: general engineering fabrication and maintenance in a sugar company

Brief history, company organization and production

Western Kenya has been the centre of sugar production in the country since the beginning of this century. In the early 1970s a new factory was established on the principle of cane grown on a nucleus estate supplemented by cane produced by outgrowers.

The factory as constructed had a grinding capacity of 80 tonnes of cane per hour (45.000 tonnes of sugar per year). In 1976 the Government decided that the company should expand its capacity to 300 tonnes cane per hour. The expansion necessitated the construction of the equivalent of a new factory. By 1982 the project had been expanded to give the company a potential production capacity of 210.000 tonnes.

The shareholders of the company are the Government of Kenya (71 pct.), an overseas development corporation (17 pct.), the Kenya Commercial Finance Company and the East African Development Bank sharing 8 pct. and a multinational sugar company holding 4 pct. of the shares.

The company contracted the overseas shareholder to undertake the management. Management contracts have so far been agreed upon until 1983. The management of the company consists of the General Manager, and four departments. These are personnel, accounts, factory and agriculture.

In 1980 the production record of the company was 163.400 tonnes. All sugar is sold to the Government via Kenya National Trading Corporation. Sugar is sold ex factory at K.Shs. 3.800 per tonne, from which an excise levy of K.Shs. 1.000 per tonne is payable to the Government, leaving K.Shs. 2.800 per tonne for the company (personal communication from

general manager, July 1981). The company has succeeded in operating a factory at reasonably efficient levels. This has partly to do with the favourable climate but also because of the strict control exercised over the cane growing and the 6.500 employees. The firm operates 3 eight-hour shifts.

Factory section and the work force

The organization of sugar production in Kenya has been studied by others (for example Mogens Buch-Hansen and Henrik Secher Marcussen 1981; Mogens Buch Hansen and Jan Kieler, 1982). The present study has concentrated on work in the factory – in particular on the workshop and maintenance section, where repair work is undertaken for the production sections. Sugar processing basically consists of crushing, extraction and juice boiling. Other functions involved are laboratory work and production control and keeping the complex going: electrician work, service, maintenance and cleaning. The factory is closed 6 weeks every year for overhaul and cleaning.

Sugar handling and processing equipment is heavy and exposed to much wear and tear. Machinery of worldwide use is imported from the U.K. The following equipment of local Kenyan production is used: (i) blacksmith forgings – for making chain parts, scrolls, wear plates, pins, tools etc. (ii) roller cast iron shells – used in rehabilitating mill crushing rolls (iii) brass castings – used in rehabilitating pumps and bearings and (iv) cane knives – used in preparing cane for milling.

Approximately 5.500 are employed in the company's agricultural section. The factory employs 1.000 permanently and 200 casual workers of the company's 6.500 employees. Factory work is divided into 14 subsections with 30 section managers and superintendents, 30 supervisors, and 40 clerical staff. Of the 900 manual workers in the factory, who are grouped according to job-functions into 9 grades, 300 are engaged in the engineering workshop and with boiler or process maintenance. 45 of the workers in the maintenance workshop were interviewed.

None of the company's production workers are women. Indeed, only a very small number of women are employed in the clerical department.

Company training policies and practices

The company is by now primarily a Kenyan concern. However, having

started as a multinational concern and still today being managed by an international professional sugar company, the firm has incorporated century long experiences of how to organize sugar production.

Being part of an international concern and being a large-scale production unit, the company is self-sufficient in a number of areas: research and development, servicing and maintenance, own training school, housing estate, etc. Also physically, the company resembles an island unto itself. Thus, spin off activities have been much less than what was expected at the early stage of project planning.

The policy of the company is clearly to build up a stable labour force. It is recognized that this takes time. In the words of the engineering workshop manager:

“In general we are short of skills as compared to other sugar industries developed over much longer time spans. Our best artisans have good skill levels in trades such as brick-laying or fitting. But the practical experience is frequently not at a high level”.

With regard to building up a cadre of skilled artisans the company applies



Large firms have own training facilities.

several strategies: (i) recruitment of the better candidates directly from technical schools (ii) foreman apprentice-training (iii) in-house and on-the-job training (iv) advertisement for workers with particular skills and (v) sending target workers for public skill improvement courses.

Generally, the availability of adequately skilled labour is not recognized as a major problem in the engineering and maintenance workshop. One can select and chose the more adaptable workers.

The shortage is rather in technical instructors, and certain specialist skills:

“To improve the skill level of the work force in the company, more ‘in-house’ training facilities, with full time technical instructors, moving around various units in the industry for intervals of about one month at a time, might allow specialists to be hired in various areas of skill and knowledge”. (Engineering workshop manager, July 1981)

The company’s self-sufficiency may be underpinned further, as the company develops. At the time of visit, ambitious plans were being discussed for how to include *all* categories of workers in a comprehensive training programme:

(i) Induction training

Induction Training, including general introduction to the company and specific introduction to the workplace, were being proposed for new employees at all levels. “This is likely to reduce labour turnover and shorten the period of time before a new employee becomes effective in his work”. (1981 Training Needs Analysis and Suggested Action Programme).

(ii) Graded operatives

Graded operatives training were being proposed for various strategic operations in the estate and in the factory. These included harvesting and nucleus estate operations for headmen, tractor driver training (there are 500 tractor drivers employed), and training for transport assistants and supervisors.

At graded operatives level the action programme also included training for process operators. Trainee process attendants and operators would be

recruited from schools, and would generally learn the process on the job. The more able trainees would be identified and a more structured programme devised, ensuring that, over a period of 2 years, experience of the whole production process is acquired. This training follows an established pattern. But the training contains scope for improving the technical understanding of process operators, and a good deal of this is expected to be carried out "in-house".

Boiler operators were singled out as a group needing a greater appreciation of the principles behind the equipment they operate. The Industrial Training Centres of the Ministry of Labour were in the process of introducing these courses which might be able to help. The company will continue to send boiler attendants on suitable skill improvement courses.

(iii) Apprentices and artisans training

The company in 1981 had 62 apprentices under training (approx. 20 in each year). Declining labour turnover figures have meant that the 1980 trainee-intake had to be given notice that employment could not be guaranteed at the end of the period of apprenticeship. The same situation seemed to apply in 1981 thus not making it possible to employ in skilled grades all those completing their apprenticeships.

If the trend of labour stabilization continued – and economic trends of the economy supported this expectation – the company would have to cut down on new recruitment of apprentices. However, in view of the prospects of a new brewery and a chemical factory using molasses coming to the vicinity, the company would not reduce its recruitment programme dramatically as long as this – unpredictable – opportunity was on the horizon.

New apprentices will have been recruited in 1981 in the following trades:

- 7 Plant mechanics
- 4 Motor vehicle mechanics
- 2 Auto electricians
- 3 Welders
- 5 Fitters
- 2 Electricians and
- 2 Machinists.

Aptitude tests were conducted in 8 technical schools in 1980 and a ratio of approximately 3 interviewees were invited for every vacancy.

(iv) Skill improvement

Several of the artisans – mechanics, first of all – were in need of on-the-job training to broaden their skills. For appropriate skill improvement courses the company will have made use of courses available at the Industrial Training Centres. However, the company intended to rely more on in-house training for skill improvement purposes.

Certain job categories are difficult to fill with qualified artisans, simply because they are in short supply in Kenya. In the electrical section there was a major recruitment problem with powerhouse operators. Consequently the company intended to recruit 3 apprentices in 1981 to be given training as powerhouse operators.

(v) Technicians

The company only describes officially as “technicians” those who are being sponsored as block-release trainees at the Polytechnics. In the category of technicians the company’s saturation point was also getting nearer.

Since the average age of supervisory staff was relatively low and turnover in some areas was also low, the company was carefully judging the amount of technician training needed to avoid on the one hand a scarcity of trained personnel and on the other an over-abundance leading to personal frustration and increasing turnover.

With a declining trend in technician turnover it was doubtful whether the 18 individuals undergoing formal technician training on a block-release basis could expect to be offered supervisory positions on completion of their training.

Within its comprehensive training programme the company also operated training for financial and clerical staff and for senior management.

To conclude: the trends in artisans’ and technicians’ employment in the firm indicated that a latent inflation in training levels had begun. I.e. qualifications of a certain level did not automatically entitle one to employment at the equivalent level. Thus technicians may be used for doing artisan work, etc.

Besides being determined by the requirements for new apprentices and

specific skill-upgradings, the company's reliance on public training facilities for artisans and technicians, depends on the quality of training offered in the Government's training institutions. In this respect the record is somewhat mixed. Thus the administration at Kenya Polytechnic was considered by the company to be particularly poor, resulting in poor morale.

The company's training superintendant expressed his critical views on Kenya's industrial training policies in the following way:

"The training levy payable to the government is collected promptly. The reimbursement grant takes well over a year to be paid!

Calculation of the training levy is based on tonnage of sugar produced, - i.e. Shs. 4 per tonne since Sept 1980. Before that Shs. 2 per tonne. For the years 1979 and 1980 we paid 219.200 Shs. and 432.000 Shs. The reimbursement grant, to which we are entitled has not yet - July 1981 - been repaid.

We value the Industrial Training Centre but obtain little help in other training aspects from the Government (e.g. technicians, supervisors, clerks, managers).

As general advice to the Government on its industrial training policy, we think they should take more care to improve standards and control Trade Testing.

Secondly, more encouragement should be given to companies to collaborate for training purposes, financial inducements for instance.

And thirdly, the Government should discourage the burgeoning "back-street" industrial institutes and put more money into expanding reputable institutions".

Workers' training experiences

In a rural area where job opportunities are scarce, workers who want to stay in their home area are under extra pressure to remain in a job, once it has been obtained. Of the 45 workers interviewed, the majority were employed in connection with the expansion of the company in 1977. Others have been with the firm since it first started producing in 1971-73. In general, labour turnover is very low among the engineering maintenance workers.

All the people interviewed are from the Western Province, neighbouring Nandi District or Nyanza Province. They all work in the engineering

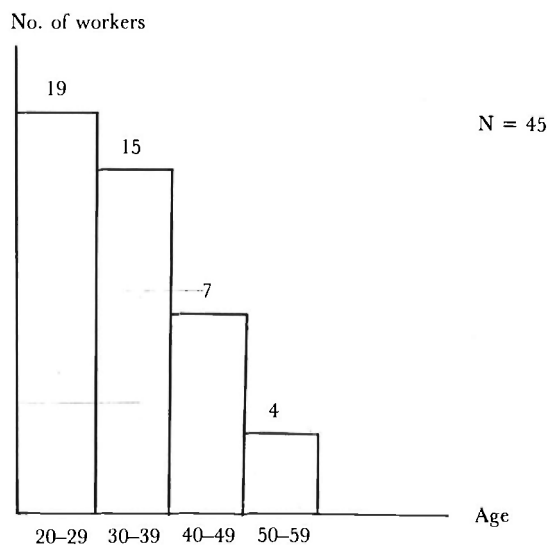
workshop or belong to the factory maintenance staff. Trades such as blacksmiths, tinsmiths, welders, moulders, turners and fitters, all being considered skilled or semi-skilled, are represented.

The work force is relatively young and many have been recruited straight from school-technical school or academic school. New recruits are taken in to fill vacancies but first of all to be apprentices. They follow the standard DIT programme. On-the-job instructions are given by the workshop superintendents and supervisors. Very few of the elder workers have had formal training beyond primary school.

A typical job history of the 11 workers 40 years old or above was that they previously worked for larger private companies, often in Uganda and Tanzania, in parastatals or in the former East African Community.

One fitter machinist spent a year at Kenya Industrial Training Institute in Nakuru and one general fitter, was trained as a technician in Russia. Otherwise the elder workers have been trained on the job. Their former workplaces include, among others: East African Railways, Coffee Board of

Figure 8. Age distribution



Uganda, sugar factories in Uganda, Tanzania, and Kenya, Deweto Engineering and Construction, Gailey and Roberts, Tea and Sisal Estates, Textile Industries, and Steel Rolling Mill.

For the individual worker it is important to obtain a good placement in the 9-grade job-classification of the sugar industry. There seems to be quite a bit of arbitrariness in this respect, however, the company having the upper hand in placing the workers in grade categories at its discretion.

Two examples will illustrate the situation:

1. A mechanical engineering graduate from a Harambee Institute is employed in the engineering workshop. He performs skilled work of a high quality, but he has been wrongfully placed in grade VI – a semi-skilled job category. His own explanation is that he is a victim of tribalism. The “real” explanation is more likely to be, that the Harambee Institutes of Technology are operating a proficiency system that employers have never formally approved. It is still at the employer’s discretion to ignore certificates which do not fall within the regulations of the agreement between the employer and the union.
2. A 45-year old fitter with a long training- and work history is placed in grade VIII. He was trained as a technician between 1965–70 on a Kenya Government scholarship in a Russian textile institute from which he holds a diploma. After his return he worked as supervisor and personnel manager in three different firms until he was employed as a fitter in the sugar company in 1975. He left the previous employer – a construction firm – since its contract finished and he would have had to move away from his home area to keep the job. He feels he has been deceived by the sugar company since he was not given a supervisory job, and has not advanced during his five year stay with the company. Like his colleague above, he explains his misfortune as being caused by ‘tribalism’.

The case again illustrates, that the employer can refrain from recognizing diplomas and certificates. This is what many Kenyans who have been trained in Russia and other East European countries have experienced. Secondly, the case illustrates, that job opportunities – in particular at supervisory level – are very limited. A person, who like this man, wants to stay with his family in the rural area is left with very few jobchoices. To alleviate his economic and personal frustrations he was considering starting his own business. He has applied for a loan at

Kenya Industrial Estates to start a tailoring business. After one year there was still no reply.

Social relations of metal-workers in the sugar industry

(i) Social background

In Kenya, as in other developing countries, the industrial labour force is largely first generation industrial workers. The more so in a country where technical trades have been greatly dominated by immigrants – Europeans and Asians. And obviously more so in this rural based company than the urban based company 1 above.

A breakdown of fathers' work occupation shows:

	<i>No. of workers</i>
Farming	28
Business/shop	4
Carpenter, fitter	3
Clerk	2
Policeman, teacher, traditional doctor	3
Cook	2
Watch-repairer	1
Driver	1
Headman in sugar plantation	1
	<hr/>
	45

As expected, the majority come from a farming background. Only three fathers have been in trades resembling the respondent's own job – i.e. 1 carpenter and 2 fitters.

(ii) Land tenure

Although the people interviewed are all in full time (46 hours) jobs, many maintain a close relationship to the land by owning a plot. The picture is, however, mixed. 17 say they have no land. How many of these people may inherit land or buy land at a later stage, is of course impossible to say. It is significant that 38 pct. depend solely on wage incomes.

The land owned by 28 interviewees is distributed as follows:

	<i>Persons</i>
1- 5 acres	19
(1-2 acres 5)	
6-10 acres	3
11-20 acres	2
20-30 acres	1
40-50 acres	3
	28

Contributions to family budgets from their own subsistence production are significant for those workers who have access to land, and a few are able to make savings from cash crops – sugar or maize. But the main source of income is the respondent's wage, in eight cases supplemented by the wife's income from wage-work or from trading.

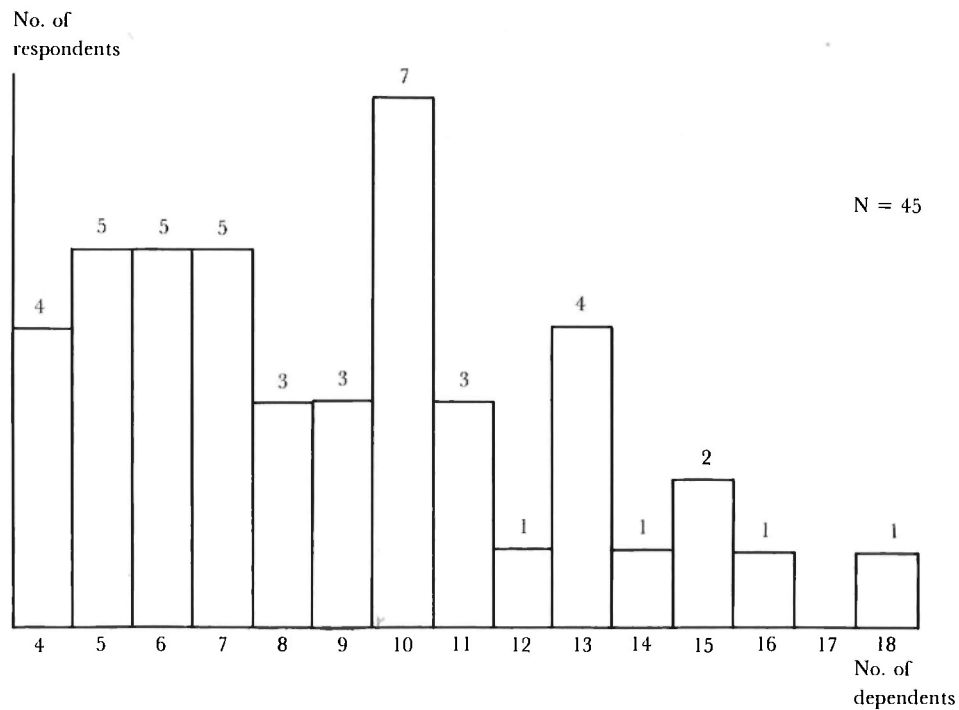
It is impossible to estimate the contribution of women's work to family income since it is not formally calculated in subsistence farming. In the landowning families, the contribution is certainly significant, since women are the primary land tillers. In order of frequency, land is cultivated by wife and children, parents, brothers and sisters. One third of the landowners hire labour on a full-time basis or as a supplement to family-workers.

(iii) Dependency burden

The significance of having access to land and thus to a contribution to the family's subsistence should of course be seen in relation to the dependency burden of the individual. In this respect, all the workers – single as well as married ones – are responsible for the maintenance of others regardless of whether these are primary dependents or relatives being helped occasionally.

The figure shows that almost 50 pct. of the respondents bear responsibility for 10 dependents or more. The distribution does not change significantly when the 17 workers who do not have access to land are separated. One

Figure 9. Distribution of respondents according to number of dependents



third of the landless carry responsibility for more than 10 dependents, and none of them for less than 4 people.

(iv) Terms and conditions of work

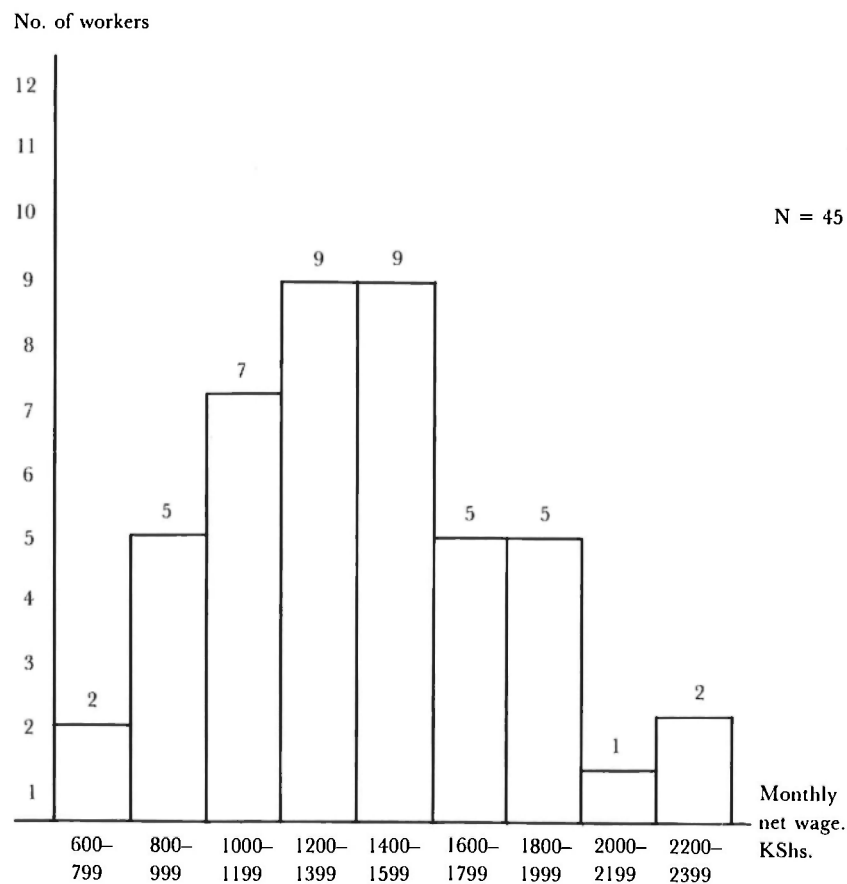
Terms and conditions of work are regulated according to the agreement between the sugar industry and the Sugar Plantation Workers Union.

The union plays a relatively active role in the company. 80 pct. of the maintenance workers are unionized. Some have decided to disaffiliate due to internal strifes in the union, which at times have diverted the attention away from the major obligation of the union: to struggle for better terms and conditions of employment for its members. Also members blame the union for diverting its interest away from the well-being of its members.

With an average net income the month before the interview of 1.650

K.Shs. varying between 650 K.Shs. and 2.300 K.Shs., it is not surprising that almost everybody relies on overtime. Thus a substantial part of the workers' income stems from overtime work, varying between 40–120 hours overtime per month, a few having a record of up to 150 hours overtime work. The high frequency of overtime work is possible since the company works a round-the-clock (3 shifts) and round-the-week system. At night one hour equals 2½ hours. While overtime payment tends to become an absolute necessity to increase workers' wages, it is also an indication that without exception all workers get an advance on wages every month.

Figure 10. Wage structure of engineering maintenance workers, June 1980



The average monthly wage of 1650 K.Shs. is well above the consolidated wage rates for skilled manual work in the sugar industry, due to the amount of overtime work in this company. On top of this the company provides housing for the majority of its workers.

To sum up: relatively speaking, the skilled manual engineering workers in this company are remunerated well. This is both in relation to the income level in the rural area where they live and relative to their urban colleagues. In absolute terms, however, the industrial worker is not necessarily left with much to spend for himself. The hard earned incomes are spread out among a large number of beneficiaries, and thus contributes indirectly to support a certain amount of commercial activity in the area which would otherwise be very minimal. As a conclusion some comparisons between the two companies will be attempted.

Conclusion

The two companies belong to the minority of private firms in Kenya that are continuously engaged in various training programmes for their workers. Both have contributed to building up a skilled Kenyan labour force in the metal trades. Beyond this general positive observation, the two profiles elucidate different problem areas that are believed to have significance for understanding the conditions of workers and the complexities involved in planning industrial training programmes for Kenyan industry and for Kenyan workers.

The following observations can be drawn from a comparison of the two companies:

- There is very little routine work involved in either engineering production in company 1 or in engineering maintenance in company 2. Some batch production is being introduced in company 1, which after some time will become routine work. Already some of the bench workers in company 1 complain that they are doing mostly standard operations. But in general, production/maintenance work varies continuously and requires highly skilled workmanship.
- Company 1 built up its work force over a long period. The workers are relatively old and most have been trained on the job by the company's elder workers. Labour stability is very high for all worker categories, but especially among the unskilled and semi-skilled workers. Except for

electrical trades there is generally no severe shortage of workers with particular skills, though some are occasionally lost when a worker decides to try out his chances with better paying employers.

- The policy of company 2 can be characterized as self-sufficiency in all functions concerning sugar production. Thus there is a strong motivation for building up a stable labour force in the skill intensive operations. The company offers (slightly) better conditions for a few target workers. Comparatively higher wage costs for the few can conveniently be passed on to consumers. It is able to attract highly competent artisans from other companies and to select the better candidates from technical schools. If any company can be accused of “poaching”, it is a company like this, although poaching is not done deliberately by looking up skilled workers in other companies.
- However, even within the skilled craftsman group it is still to a large extent at the discretion of management in both companies to post their skilled workers to lower job categories than what their job performance justifies. It certainly is a reflection of the unions’ weaker negotiation position. And it is a sign that productivity/wage links are absent.
- What immediately looks like relatively high wages for the engineering craftsmen cannot be taken at face value. Included in the net monthly wages – in company 1, on average 1250 K.Shs. per month, March 1981; company 2, 1650 K.Shs. per month, June 1981 – is overtime payment. Overtime work is considerable, especially in company 2, but is also frequently practised in company 1.

In view of the high level of unemployment in the country – and increasingly so among technical school leavers, – extensive overtime work is unacceptable. For the individual worker it is regrettable that relying on overtime work becomes a necessary means to keep wages up – a very insecure means, of course, since it is only available when there are sufficient orders.

The conclusion must be that the work of the engineering craftsmen could be shared between more people thus allowing more workers to be trained. This should certainly be looked into by the National Industrial Training Council NITC and be a concern of the trade unions in particular.

- In several respects income patterns seem to diversify: relying on overtime work is particularly urgent for workers who have no or very limited access to land as a supplement to family subsistence. Though ties to the

land are common, both the urban and the rural based workers of the two companies include people who must be considered as fully proletarianized workers. With declining real wages in Kenya in general the urgency for maintaining supplementary subsistence is increasing. This urgency is counteracted by the pressure on land. If the skilled workers are not the first to be forced off the land, the land pressure will also involve them. A few of the workers *have* been able to save and invest in land (e.g. sugar growing). But the overall impression is that family responsibility is rarely borne by a single wage earner. It is shared between several income earners – be they permanent or casual incomes – and individual wages are shared widely among dependents.

- An element in the younger sugar factory's attempt to build up a stable labour force has been its systematic training of crafts- and technician apprentices, supplemented with skill-improvement courses and company-specific instruction in the factory's own training school. Company 1 only added the apprenticeships later when the tripartite National Industrial Training Council got involved in formulating labour training policies. In both companies a saturation point seems close. Explanations lie both within internal company considerations and the overall economic development: Company 1 is not fully convinced of the benefits and relevance of the 3–4 years apprenticeship training programme. Several apprentices on completion leave the company. It is moving towards shorter, job-specific training preferences.

Company 2 has completed its establishment and expansion phase. The workshop labour force has been built up and has remained stable. The need for new apprentice recruits is waning. Over and above these internal company explanations, the economic trends in the country have had their effect. Recession rather than growth is currently influencing restrictive personnel and training policies in both companies.

- Both companies have contributed to building up a skilled work force in the metal trades. And they still are. But new training policies are now appearing in both companies: i.e. a reduction of formal training and a shift towards more job-specific learning – in correspondence with the prevailing training philosophy of the Ministry of Labour based on Modules of Employable Skills, in fact. If these trends continue and generally apply to other engineering firms – the effect will be counterproductive to the further development of skilled workmanship in the metal trades. Moreover, they will be counterproductive to the economic development

path Kenya needs to seriously consider, i.e. the development of local intermediate and capital goods manufacture.

- The reactions of the two companies may be the sort of warning that has motivated the Kenya Government to adopt the employer oriented, job-specific Kenya Intergrated Training System. It should also be a warning to the trade unions that labour training policies are part of industry's way of tying, controlling and determining the conditions of the workers.

Chapter 4

Conclusion

Company observations in summary

Metal manufacturing manpower requirements and shortages

With regard to skill and training requirements, the overall picture that emerges from the 5-company survey confirms similar observations made by Mitschke-Collande (1979). Thus, the capital goods department of fabrication and manufacturing, but also central workshops of maintenance and repair, tend to correlate more with manufacture of sophisticated products, with small or medium-scale output, than with batch production.

There is little segmentation of the work process. The majority of workers have to perform a variety of complex operations with handtools, different machine tools, and measuring instruments. These tasks are skill- and labour-intensive and at the same time require formally-trained and practically-experienced craftsmen. Commonly, training of semi-skilled workers is undertaken on-the-job in the enterprise concerned. But, fairly detailed planning at the national level is necessary for highly skilled craftsmen who require formal training, usually beyond the internal capacity of the company.

The overall picture from the 5 companies is that there is no general shortage of skilled craftsmen in this cross-section of metal industries. This must of course be seen in light of the recession that has affected all the companies, if not yet to the extent of cutting down on the labour force beyond natural exits. Labour shortage of particular skills has been more acute in times of expansion, but even now, some strategic labour skills are in higher demand than others, and increases the labour turnover in these categories. This concerns in particular the highly skilled all-round fitters, who by virtue of their particular broad-skill qualifications can easily be shifted between different operations.

One of the companies – the fully Kenyan owned, managed and operated – a general engineering workshop with 100 employees, recently lost 10 fitters. This company, which used to engage itself actively in craft apprentice training, has now disengaged itself from apprentice recruitment. In fact,

the company has shifted much of its human resource development outside the company by putting out orders to subcontractors, when orders occasionally exceed the firm's own capacity.

Other craft skills of strategic importance are in short supply. Thus, foundry work is particularly demanding with regard to skills and experienced craftsmanship. However, the demand for foundry workers is small, reflecting the limited numbers of foundryworks in Kenya. Thus, despite their specialized skills, foundry workers find it more difficult to negotiate for terms and conditions of work exceeding those laid down in trade union-employer agreements, since alternative workplaces are few. Foundry work, besides being skill demanding is also particularly unpleasant, and recruitment of new foundry works trainees has been difficult in the company in question. The problem of approaching labour shortage in this field may find its solution by way of technological development, since plans are underway to substitute the current high-furnace process with computerized aid. This is possible since it is a very large company, in fact the largest metal workshop in East Africa with a long history dating back to the turn of the century.

To ease the shift to computer-aided foundry processing, one would expect that retraining of foundry craftsmen and technicians is necessary, as was pointed out by the head of the Foundry Section. Whether it is a sign of slow planning, of information being withheld between management and the foundry department, or that there are alternative plans for recruiting untrained labour for the new process, it is remarkable that the introduction of advanced technology like computer-aided processing is not carefully prepared and manpower with relevant labour skills secured in time. Of course, the necessary training precautions themselves pose a problem, since suitable training facilities are not available in Kenya. Thus, training for computer-aided foundry processing and casting, whether undertaken as skill-improvement or skill-development training, must include some overseas training. This may explain the delay in the particular case.

None of the other companies rely on computer-aided machinery, and none expect radical technological innovations or changes with implications for labour skills for the time being. Company specific, effective labour demand is thus at a low level in the 5 firms in the beginning of the 1980s. To speak of a skilled labour shortage in Kenya in terms of effective demand, does not make much sense if these observations carry any general

significance. In terms of social need, shortage of labour skills is a different matter.

Human resource development in the firms

The original assertion held that the companies were expected to represent the primary concern for industrial manpower development. Thus, the companies would be instrumental in passing on the actual training responsibility to the state.

What we find in reality is a less direct connection between company specific labour needs and training implementation. Obviously the tripartite National Industrial Training Council and its trade councils were instrumental in formulating the apprentice-training system. And the employers in particular were instrumental in the process of establishing the training levy-reimbursement-system. This was shown for the General Engineering and Metal Manufacturing Industries' Training Committee (GEMMI) in Chapter 2.

The role of the companies 5 years later in the apprentice-training reforms, based on KITS/MES principles, is less obvious. Their involvement was superseded by the Directorate of Industrial Training itself and by the donors who were strongly instrumental in introducing the new modular training principles.

One may suggest that by the time of the KITS reform, the DIT had established itself as an institution with its own policies, much less influenced by the interests of companies than what was the case 5 years earlier. The improved prospects for continued growth in the early 1970s compared to the late 1970s may also have determined the companies' more direct interest in skill development in the earlier period.

This general trend of less direct influence by the companies on DIT's training activities might have been counter-balanced by a stronger interest in training by the Trade Unions. Certainly, the prospects of the KITS reforms should have raised the suspicion of the Trade Unions that workers' potential mobility and marketability would decrease as their skill profiles changed from broad skill craftsmen to narrow skill operators. This did not happen. The KITS reform seems to have been accepted unconditionally by the Trade Unions.

It is characteristic that industrial training is not generally understood as

Figure 1. Companies' reliance on different recruitment and training practices for craftsmen, 1981.

	Comp. 1	Comp. 2	Comp. 3	Comp. 4	Comp. 5
Public apprentice training	+~	+~	+	+	-
Own training school	-	-	~	+	-
Systematic on-the-job training	~	~	~	+	-
Incidental on-the-job training	+	+	+	+	-
Institutional skill-improvement training	~	-	+	~	-
Relevant skills secured through recruitment:					
(a) from technical school	-	-	+	+	-
(b) from the gate	+	+	~	-	+

Note: + frequently used.
 ~ infrequently used.
 - never used.
 +~ previously frequently used, currently infrequently used.

Company 1. General engineering, private MNC managed, intermediate size, urban based.

Company 2. General engineering manufacturing, private Kenyan owned and managed, intermediate size, urban based.

Company 3. General engineering fabrication and maintenance workshop of a large-scale joint Kenya Government/MNC agro-industry, rural based.

Company 4. General engineering fabrication and maintenance workshops of a large-scale parastatal, urban based.

Company 5. General engineering workshop, owned and managed by a local Asian resident, small-scale rural based.

a central issue by the Trade Unions in Kenya, despite COTU representation on the National Industrial Training Council. When workers in the companies complain about lack of further training opportunities, as happened in several instances during this study, they also perceive their grievance as being an individual private problem between themselves and their employer rather than a trade union issue.

If we turn from the involvement by the Federation of Employers and Trade Unions in industrial training policies to the training practices of the companies in the study, the following picture stands out (see Fig. 1 above).

There are marked differences in recruitment and training practices between the five companies. At the extremes are company 4 and 5. Company 4, being one of the oldest and largest metal workshops in East Africa, has old, established procedures for securing almost self-reliance in manpower-resources. The company is furnished with a rather advanced internal training machinery, including a training school, training personnel, internal recruitment and promotion procedures, etc. In most respects it is self-reliant in training, relying on the public apprentice-training facilities when necessary. It even provides training opportunities for trainees sponsored by other companies in Kenya and for trainees from neighbouring countries.

At the other extreme is the rural based company 5. The general conditions of work in the firm are poor and training is something unheard of except for the 2 supervisors/foremen, who are related to the owner/manager. Workers are recruited from the gate, most have some previous work experience, from between 1–4 jobs, interceded however by longer periods of unemployment. There are 28 employed at the moment, over half on a casual basis. None are counted – or remunerated – as fully skilled workers, although a few have the Government Trade Test. None of the workers are more than 30 years old, indicating a high labour turnover. The firm has no ambitions of engaging in systematic training. The training levy is paid as a mere tax.

Between these extremes fall the remaining 3 companies. The practices of 2 of these are described in more detail in Chapter 3. Not unexpectedly the recruitment and training profiles of company 1 and 2 resemble each other most, as the companies do in a number of other respects except for ownership/management. Company 1 has foreign management, company 2 full Kenyan ownership/management. What types of organizations the companies belong to – e.g. trade union affiliation – does influence the general organization of work conditions, including training. Company 1 and 2 both have an agreement with the small and not very strong Kenya Engineering Workers Union, KEWU, to which company 5 would also belong if it was organized. The affiliation of the parastatal company 4 to a stronger and more experienced trade union partly explains the better conditions of work – and training – provided by that company.

To sum up, the current recruitment and craft training practices of the five companies can be described as follows: Company 1 and 2 – the two

larger general engineering companies in Nairobi – have been active in craft apprentice training in years of prosperity and growth. The intensity of their craft training engagements is related more to the conjunctures of their business than to saturation of manpower requirements or to lack of satisfaction with the quality of training provided in the Industrial Training Centres of the Directorate of Industrial Training. In fact, company 2 recently lost 10 general fitters but has no plans for retraining substitutes. Likewise, the amount of training undertaken by company 3 reflects the phases of expansion of this company. Expansion being more or less completed, the annual intake of apprentices is currently being reduced.

All three companies rely on different forms of on-the-job training. But since there are no current long- or intermediate on-the-job training plans we would call these arrangements incidental on-the-job training (see Figure 1). A good example of this is a contractual arrangement between company 2 and a machine tools manufacturer in India. Company 2 has recently bought some large second-hand lathe machines in the Indian for a couple of months to instruct the workers in the Kenyan firm on how to use the machines.⁶

Otherwise one observes that company 2 practices sub-contracting with individuals or small teams too small to establish their own firm. By shifting orders to sub-contractors, a number of responsibilities – for example training – are also shifted outside, although two such sub-contractors are in fact former employees of company 2. Today they work on sub-contracts for other firms as well.

Company 3 – the maintenance workshop of an agro-industry – has developed a more strategic attitude to labour training. Its common practice is to visit secondary – often technical – schools before graduation and to recruit new trainees from among the cream of the graduating classes. Secondly, the company provides industrial attachment opportunities for technical school trainees – for example trainees from Harambee Institutes of Technology – which gives the company a possibility to hand-pick talented trainees for later employment. Recruitment at the gate of workers with strategic skills thus becomes less practised in company 3. Company 5 on the other hand is geared to this procedure alone for securing necessary labour. In fact its total disengagement from any training practices worth the

6. The Indian connection of this fully Kenyan owned and managed company is an interesting observation. Thus, the Financial Manager of the company is an Indian expatriate on a 2-year contract.

name, is matched by a rather incidental recruitment policy. Workers are hired and kicked out at short intervals – with the expected result on product quality. In fact complaints from customers about the quality of installations and repair work undertaken by this firm are many. The company's survival despite such customer complaints seems to be determined by the limited number of competing companies in this semi-rural area, and by the constant access to cheap labour with some limited relevant experience, as workers are always around looking for jobs.

A contributing factor to keeping cost structures competitive is also its practice of keeping some workers as so-called trainees, where in reality they work as low paid labourers deprived of any systematic instruction worth the name of training.

It would be wrong to accuse this company of labour poaching – a common accusation otherwise against many private companies. Contrary to the recruitment practices of the company, poaching implies active identification of workers in other companies and subsequent recruitment. Company 2 in particular, complains about poaching problems, but observes in addition, that several workers who were lost due to promises from other companies of marginal increments, have later returned to be re-employed.

Company 4 is exceptional with its long established procedures for securing self-sufficiency through internal training, mobility and promotion practices. Over the years some alternative employment possibilities for the workers have developed outside this established parastatal in the Kenyan society. But few companies can offer general conditions of work and preferential fringe benefits comparable to those offered by the parastatal. It is not surprising, therefore, that labour stability is high in company 4. However, one must conclude that the company nevertheless contributes to developing the country's labour force beyond its own needs. Thus throughout Kenya one will find craftsmen who gained their experience, and often training, at some stage in this set-up. Their reasons for having left are rarely to find better employment but rather to meet some of their social needs, first and foremost among them proximity to their home and their family.

Formation of an industrial labour force in Kenya – Concluding remarks

In discussions about industrialization experiences and prospects in Kenya it has been argued by people like K. Karuga (1979) that the redeployment

of industry to Kenya is hampered by the fact that labour in Kenya is not socially formed. Now, what is meant by this? Is it correct? And what are the implications for future industrial development prospects?

Several indications from the study may elucidate the ramifications of 'the social formation of labour'. It should be appreciated, of course, since we talk of 'formation' – a concept implying a process – that observations from the 5 engineering companies are indicative only.

Given the different production- and labour relations in the five companies, the following observations seem to substantiate Karuga's point:

- The vast majority of the craftsmen are first generation industrial workers. Only 1–2 pct. come from industrial working class homes. A larger – but still limited group – had wage-working parents or fathers belonging to the salariat or small business strata. The vast majority, however, are from peasant family backgrounds. In addition to this, the majority of the workers are migrant workers, if not coming from outside Kenya, often coming from substantial distances from their work place. Not unexpectedly, this is less pronounced for the workers in the two rural based companies. In fact, the large-scale agro-industry related workshop seems to be a welcome opportunity for workers from that area to take up employment in their home area.
- It is well documented that first generation industrial labour expose different characteristics from workers who have been exposed to longer experiences of industrial wage work. (See for example E. J. Hobsbawn, 1976 and R. D. Grillo, 1973). In some terminology the first generation worker is less disciplined and cannot subject himself to the hierarchical structures of organization in industry, to adhere to punctuality in timing his work and doing it to the required standards. His ties to the land relate to his lack of working class consciousness, etc. Observations from the study, however, suggest that these generalizations need to be qualified. Certainly the spatial structure of industry in Kenya interlinks with the social situation of the worker and affects his role as industrial wage worker.⁷ Industry is massively concentrated in Nairobi, Mombasa and a few smaller regional towns, while the majority of workers originate in the densely populated areas of Western Province, Nyanza and Central

7. I keep using the designation him, his, etc. about the industrial metal worker, since 100 pct. of those interviewed in the study were male workers.

Province. When daily commuting is impossible, and the economic – and socio-cultural – basis for transferring the family from the home area to town rarely exists, this sustains a pattern of male work-migration. No wonder, the employers still commonly complain about the ‘instability’ of the workers. Family obligations at births, illness, family-crisis, celebrations and funerals for example will easily keep a worker from work for several days. Ironically, this complaint was aired in company 1, where we observed an extremely high labour stability in terms of years in same employment. But also the daily concern of the worker who is separated from his family but still has a number of responsibilities for family affairs seems to influence his working capacity. It lowers his productivity, as was expressed by a company production manager. This general picture should also be modified. In company 4, for example, the family pattern of a single male worker in town, his wife and children and parents in the countryside, has changed. An extensive housing scheme has been part of this parastatal’s strategy to stabilize its workforce. Thus many more of the craftsmen here have been able to keep their wife and some children in Nairobi.

- A third distinguishable pattern emerges from the study: We would argue that the interplay of industrial spacing and the high rate of male migration explains the surprisingly high rate of polygamous family structures among the engineering craftsmen. In almost all instances, the polygamous workers stay with one family in town, while another wife resides in the countryside. There is no observable generational difference, in fact younger workers are as apt to have more than one family as the elder workers. On the average one fourth interviewed workers had more than one wife.

With this family structure, double household or separated single family, the burden on the industrial worker to provide for his dependants remains high. Generally the worker with both an urban and a rural family has more children than the single family worker. The dependency burden on both is high, however, and the general observation is that the number of dependants tends to grow with income rather than stop at a specific number of primary dependants. Thus, the impression is that a stable wage income is spent on the very basic necessities of living in town, on contributions to the nearest relatives. What is left over is thinly spread out between a number of secondary dependants.

- For the time being, after continuous real wage reductions for several years, savings for investments or for larger consumption goods are extremely limited. Our material cannot fully illuminate the urban-rural/rural-urban transfers of resources. The impression is there is a net transfer from the urban to rural area – however limited – in the form of contributions to family subsistence, school fees and ceremonial occasional expenses.
- In addition to what has just been said about the engineering craftsmen's family structure, other aspects of labour reproduction relate not only to the particular situation of the first generation worker, but more so to the general pattern of reproduction in a developing society. Thus, the wage incomes of this work force, whose stability in the Kenyan labour market is indeed as high as it gets, is certainly a core element in the reproduction of the worker's dependants. Nevertheless, it is rarely the single source of income, topped as it is in the first place by substantial amounts of overtime work. Brothers typically share some responsibilities, while few of the wives in this sample have wage incomes. Their contribution, the value of which is difficult to measure, is first and foremost from cultivating the land and thus contributing a major part of the family's subsistence. Wives typically bear the responsibility for managing family land, either alone with the children and parents or by hiring land-labourers in peak seasons. But a very small minority grow enough to sell more than a few bags for cash beyond subsistence production.
- While the typical feature of the metal worker's reproduction pattern is pitching together a stable income, subsistence supplements and minor contributions from other relatives – brothers or sons for the most – there are indications of certain changes in this pattern. Thus, a process of proletarianization seems to be underway in the sense that a number of families today no longer rely on their own land for subsistence contributions, but on that of relatives, or they have no access to land at all. In the first case the rural based wife and children stay with parents and not on their own plot. In the second case the worker is typically young, unsettled as yet but with no access to land. He is heading towards a full-time urban-based life, most likely with a family at some stage. Our material is not large enough to draw extensive conclusions on these trends. But they suggest ideas for observing new patterns of labour reproduction in the years to come.
- The observable pattern of differentiation of social reproduction is paral-

lled by a differentiation of the labour force according to its skill acquisition. There is a marked difference between the old-time worker with 2–3 years schooling who learned his skills from observing and copying his colonial master, and the youngster who went through technical secondary school, got credits in math and science and later spent 4 years in apprenticeship training. In the work functions and with regard to wage levels the difference is already observable and in favour of the younger, formally trained person. The employer who is likely to introduce even marginal technological innovations will prefer the worker with some theoretical training. In our material the majority of the workers belong to the first category. But time will soon reverse this trend when formally trained workers take over more of the old-timers' jobs.

- If one looks at the formation process of a skilled labour force in the metal trades, all the interviewed employers agree that the work force of today is of a far better quality than it was 10–15 years ago. The general educational standard is higher and trainability has thus increased substantially. The number of trained people from all sorts of private and public schools, including technical training institutions, has risen substantially and created an employers' market. Industry itself has contributed more to the practical experience gained by metal workers than to training them as such. And in the recent years' recession several company closures have contributed to swelling the numbers in the free labour pool.
- The process of *skill* formation in the engineering crafts has proceeded according to the speed at which industry and training institutions have actively promoted relevant training. Thus, in 1980 the availability of craft skills seemed to match or exceed the immediate demands of engineering industry. There is no reason to believe that skill formation should cease to develop at the required speed if industry so wishes and trains accordingly. Certainly the training infrastructure is available.

With regard to *social* formation of the labour force, this is obviously a different process. One should be careful in defining what is the necessary social formation of the industrial labour force for future industrialization prospects. Clearly the pattern of reproduction of the industrial labour force is undergoing differentiation, as indicated above. It suggests that the social formation of the industrial labour force in Kenya has not followed the pattern of proletarianization with the subsequent development of a nuclear

family structure similar to the Western industrialized societies. But is this pattern of the industrialized society a necessary pattern of social formation of the labour force?

If one postulates – as Karuga seems to do – that labour is socially formed only when this pattern arises, then prospects for industrial development in Kenya are bleak indeed. There are no signs that Kenya for the time being will be transformed from an agricultural to an industrial society. Nor is the modern industrial sector able to absorb all those who are seeking employment and who, by any standard, are qualified for entering an industrial worker career with the necessary training it implies.

In this situation one may postulate that the challenge for Kenya today is to shape its industrial training policy more according to the basic social needs of its population and less on the immediate and – as we have seen in the KITS debate – sometimes wrongly defined demands of the small modern industrial sector.

There is an unsaturated and constantly growing need for training and education in the Kenyan population. The challenge is to shape training in such a way that it develops the country's human resources and does not waste training efforts by orienting training narrowly to very specific jobs that do not exist and are not likely to develop for the time being.

Appendix A: Wage rates for apprentices

Wages of Apprentices are Based on a Percentage of the Wages of a Grade I Artisan

Technician Apprentices

1st year	60%	of a Grade I artisan wage
2nd year	80%	
3rd year	100%	
4th year	120%	

Crafts Apprentices

Percentage of a Grade I artisan wage

<i>Form II learner</i>		<i>Form IV learner</i>	
1st year	40%	1st ½ year	40%
2nd year	50%	2nd ½ year	60%
3rd year	60%	2nd year	70%
4th year	70%	3rd year	80%
5th year	80%		

Indentured Learnership Apprentices

Percentage of a Grade I artisan wage:

1st year	40%
2nd year	50%
3rd year	70%

Source: GEMMI 1978

Appendix B: Estimated time and manpower consumption for development of MES learning material in Kenya

The Directorate of Industrial Training runs about 30 trades for apprentices.

By January 1982 the ILO Curriculum-development Group in the DIT had collected approximately 70 learning elements (of which very few were developed in Kenya but at the Geneva head office). The 70 learning elements are supposed to cover basic masonry, equivalent to a Trade Test Grade III – i.e. less than one third of the full masonry course. The development of one learning element on the average lasts 1 man-week.

A full trade will be composed of approximately 200 learning elements for the “simpler” trades such as masonry.

If one year contains 40 effective working weeks the necessary man-years to cover the development of the 30 trades will be

$$\frac{30 \times 200}{40} = 150 \text{ man-years}$$

Some of the learning elements are applicable in several trades but this reduction is likely to be counterbalanced by delays in other parts of the system.

The ILO, Geneva, is likely to contribute with training elements as time permits (which in itself contradicts the “Kenyanization” objective of the training programme). To cover the apprenticable trades in Kenya it must be expected that 100–150 man years will be required. An estimate for the four trades which are initially put into the KITS programme: Lithographic Printing Trades, Welding Trades, Building/Construction Trades and Automotive Trades, on the assumption of 3 learning-materials developers in each group, give the following approximation:

$$\frac{\text{min. 100 man-years}}{3 \times 4 \text{ men}} \text{ from 8 to 20 man-years}$$

The time horizon for the introduction of MES-based training material on a full scale for the four initial trades is realistically (at best) 8 to 10 years.

This should be compared with the resources and time utilization set out in the UNDP project document:

Duration of the project, Development of MES-Curricula, National Co-ordination Services and Technical Support: 3½ years.

Kenya Government Inputs: K. Shs. 2,564,171 (in kind)
UNDP Inputs: US\$ 1,266,373

Source: Based on estimates provided by Børge Krogh, DIT, quoted in M. Knudsen and B. Mikkelsen, 1982, enclosure No. 14 and UNDP/KEN/79/006/1/01/11.

Appendix C: Implementation on progress of KITS

Establishment of the Curriculum Development Group, DIT, which has the responsibility to implement the KITS project, started in 1980. Its term extends to June 1983 according to the Agreement.

The Kenyan Head of Section has been trained within the ongoing Phase II and Phase I of the project. Five local staff and 6 ILO advisers staff the division, which is hoping to recruit another 18 local members.

Curriculum development has started in the Printing Trade, in the Automotive Trades, and in the Building Trades on a modest scale. The “*basic masonry*” programme (approximating Grade III level), i.e. less than one third of a broad skill education, is further in its implementation. Its close to 70 learning elements are primarily copied from ILO’s elements, which have been developed in Geneva. A few of the elements have been developed or adjusted in Kenya. The so-called *occupational analysis* (national) was conducted prior to the development of training material, but it included 6 Nairobi-based construction firms only!

So far the project activities of (a) *Training of National Staff*, (b) *Occupational Analysis* (national), (c) *Job Specification*, and (d) *Curriculum Development* have started but are all behind schedule. Other project activities, (e) *Establishment of a Printing Training Workshop*, are still awaiting commencement till the new premises are ready; and (f) *Skill Assessment, Trade Testing and Certification* has been postponed indefinitely.

Testing and Validation of the MES-programme – one of the basic principles of the MES-approach for adjusting the training material in accordance with employers’ feed-back – has been undertaken in *one single pilot programme only*. The pilot programme was undertaken in 1979 before the start of the present project. It was conducted in the enterprise of a private sector employer, a major canned-food exporter.

Pump Attendant Programme

The following observations can be made about the pilot programme, based on information by the firm’s training superintendent:

The company relies on approximately 50 *irrigation pump attendants* during the dry seasons. The job as an irrigation pump attendant is a limited skill job, but in 1979 it was felt that the pump attendants needed systematic instruction. Previously instruction had been given on a casual basis, the last

time systematic instruction by a qualified staff member had been undertaken was then 4½ years ago. In the meantime the skill for attending pumps had been passed on from one pump attendant to the other.

Contact was established between the firm and DIT in 1979 and a pilot programme was developed. It was decided to leave out national occupational analysis and to commence with the second subsystem (job specification). The work involved in producing the necessary training materials was carried out jointly by the staff of the project and the co-operating employer. It started from a very simple level – instruction on time-telling – and it included taking and processing the photographs which formed an important feature of programme development.

Preparation of the training material lasted 6 weeks employing more or less full-time 2 KIT-specialists and the training superintendent of the firm. Printing of a limited number of *manuals* was paid by the company, totalling 23,000 K.Shs – bringing printing costs alone to about 160 K.Shs. per manual. If wages had been included, it was estimated by the training superintendent that the *full cost* for developing this programme would approximate 100,000 K.Shs.

The implementation phase (fourth subsystem) of the programme was conducted entirely by the training staff of the company after they had received project guidance of the system. The exercise covered a period of eight weeks during which time 50 pump attendants and approximately 20 leadmen/supervisors were subjected to the training process without the presence of project staff at the training site.

In a report by the training superintendent, which summarizes the results of the pilot programme, it is shown that the performance of the irrigation pump attendants improved substantially. Irrigation increased in 1979 coupled with a reduction in maintenance costs. It was reckoned that the company saved 80,000 K.Shs. in a 4 months' period, partly due to the training received by the operation personnel participating in the programme.

Several other points were brought out during discussions with the training superintendent (TS):

- The preparation and implementation of the MES-based training programme was *extremely costly*. According to the TS MES-based training programmes are therefore justified only when a relatively *large number of*

persons need the training. In the case in question 50–70 people were involved.

- The company is not engaged in new MES-based training programmes, but the approach may be applied later for training drivers. The company employs 200 drivers.
- The company has picked up the MES-based *boiler operator* course that has been in use in Kisumu ITC. It is being tried out on one boiler operator. It is understood, however, that the training material used for boiler operators is not fully developed according to the MES-principles, but is based on Danish experiences and traditional educational methods with a touch of MES.
- The company uses and develops different types of training materials continually. *Slide/tape training* is used very regularly for supervisor and foreman training, some programmes being developed by the mother company, others by this local company itself.

Very simple *flip-over-script-photo-sheets* are used to train the women from the production lines (10 lines with 34 women each, in two shifts) in sanitation, sanitation equipment, and simple standardization. Each woman is taken off the line for training twice a year for half an hour. Also *simple fact sheets* showing simple tasks are used for various training purposes.

An ILO developed *supervisor-training programme* has recently been bought from a British management training centre and will be tried out soon for comparison with other supervisor-training materials.

- The *turnover* of broadly skilled craftsmen used to be around 40 per cent p.a. in the company. Today the turnover approximates 60 per cent. The reason given is that many companies do not invest in training due to the general recession. Approximately 10 per cent of the company's labour force are broad-skilled people.

It should be noted that the company has its own training school approved by the DIT and that only Motor Vehicle Mechanics and Plant Mechanics are sent to the ITC for training.

Investment in broad-skill training is therefore considered a very costly undertaking for the company and it is envisaged in the company's future training policy that *broad-skill-training will be left to the Government (DIT)*. Government subsidizing of training means that broad-skill-training within the company is 5 times more expensive than in Government training institutions according to the training superintendent's estimate.

In future the company will concentrate on “production training” (skill-upgrading) within the company’s own premises.

- The concern of the company at present is how to give relevant training to the 2,500 *plantation field workers*. Although plantation workers are limited-skill people, it has been estimated that even the simplest job for plantation field workers comprises 12–13 tasks each having 10 different standards.

Other KITS activities

In the ongoing implementation of the *Kenya Textile Training Institute* training material is being developed and a MES-approach is being applied. The team must be recommended for having done at least limited research regarding the reception of the visual/text based pedagogy inherent in the KITS approach.

From a test applied to 10–18 years old youngsters it was found that the *level of perception* of line-drawings, as those used in the training materials developed by ILO, was very low. As a consequence the team resorted to the application of photographs but is simultaneously trying to revert to line-drawings. Emphasis will now be laid on teaching instructors how to transfer the skill of perceiving line-drawings to trainees.

During our investigation we have seen no other attempt in Kenya with regard to research and testing of the relevance of using photo/line-drawings with simple explanations. Nor have we seen references to other kinds of research which reveal that pictures are perceived differently in developing societies and industrialized societies. Even limited exploration would show that such research has been undertaken in Kenya.

Source: Excerpts from M. Knudsen and B. Mikkelsen, 1982.

Appendix D: Plant and equipment capabilities, Company 1

FABRICATION SHOP:

Two Barnes press brakes - hydraulic

110 ton 8'x¼" plate

One Press Brake - mechanical

4'x1/16" sheet

One inclinable Power Press

50 ton adjustable stroke

One Rushworth guillotine - mechanical

8'x¼" plate

One Henry Pels multi shearing machine model 13

Angles up to 4x4x¾ Holes 1" dia. thru ½"

One Bennie plate rolling machine

8'x½" plate 11" minimum diameter with extra rolls for small diameters

One plate rolling machine

4'x¼" plate at 9" minimum diameter

One angle rolling machine

2x2x¼" plus "T" and Flat Bar Sections

One hydraulic pipe bender machine

Up to 3" diameter pipe

One Trumpf nibbling machine

⅛" plate

One cutting-off machine - 10" disc

½" R.H.S. or Pipe section

One TOS hydraulic power saw

18" blade up to 7" diameter sections

One Trennjeager pneumatic assisted power saw

18" blade

Boiler test pumps and equipment

One Rotary converter for

High Cycle Grinding Equipment

Grinding facilities

General Shop Use

Broom/Wade air compressor with receiver

100 cubic feet 100 P.S.I.

One overhead crane - 45' span

5 ton lifting capacity S.W.L.

One Staffa mobile crane (diesel)

GEKA-13H (No. 2616)

Puncher, cropper, shear and nibbler

BLACKSMITH, JOINING & FOUNDRY SHOP:

One Cupola coke fired

Single cast up to 800 lb.

One annealing furnace (oil fired automatic)

4x4x3" oven capacity at 700 degrees centigrade

One Alcosa gas & air furnace

for brazing preparation

One furnace - oil fired

Lift out crucible up to 200 lb. single cast Bronzes and Aluminium alloys

One pneumatic power hammer - Morini & Boss

50 kg. Hammer 6" drop height

One automatic profile gas cutter

B.O.C.

6" plate x 4" diameter discs

One spot welding machine

18" throat depth

One Manipulator machine - motor driven

18" diameter

Tow semi-automatic B.O.C. welding plants

350 amp (DIP & spray transfer)

Twelve arc welding plants

3 phase and single phase. 1 Rotary D.C. welder

Manual screw press

50 ton capacity

Fetling and trimming facilities

MACHINE SHOP:

One Denham SS & SC lathe

17' between centres, 15¼" centre height
14" bed gap, 54" swing over gap 5¼
hollow spindle

One Churchill-Redman SS & SC lathe

10' between centres, 15" centre height,
14" bed gap, 54" swing in gap, 5½
hollow spindle, Taper turning attachment
- All power feeds

One Atlas centre lathe

5' between centres, 10½" centre height,
10" bed gap

One lathe SS & SC

6' between centres, 7¾ centre height, 4½'
between centres, 8" centre height, 9" bed
gap, 14" centre over-gap

One TOS Trencin centre lathe SS & SC

4½" between centres, 8" centre height,
9" bed gap, 14" centre over-gap

Two TOS Trencin centre lathes SS & SC

3½' between centres, 8" centre height,
9" bed gap, 14" centre over-gap

One Harrison centre lathe SS & SC

3' 4" between centres, 11¾" centre
height

One Herbert Widdowson lathe

3' between centres, 6" centre height

One wheel facing lathe

43" centre height over-gap, 19" bed gap

**One Cincinatti horizontal milling
machine model No. 4**

6×1' table

**One Victoria horizontal universal
milling machine**

4' 8" table, 15" spindle to table height

**One Monovaire horizontal universal
milling machine**

4¼' table travel, 11" table traverse,
20" spindle to table height

**One Ormerod horizontal shaping
machine**

18" stroke

**One Webster-Bennet vertical boring
machine**

36" diameter table. Auto controls

**One Kitchen Waite oil grooving
machine**

**One Stephen Wirke key slotting
machine**

12" travel, ¾" maximum single width

**One Brown-Sharp universal
cylindrical grinding machine model
No. 2**

7½" centre height, 24" between centres

**One Milwaukee horizontal surface
grinding machine
(Toolmaster Grinder)**

16" table travel, 7" table traverse,
12" spindle to table height. Vee and
magnetic clamping

One Norton surface grinding machine

48"×10" magnetic table

**One Dormer centre point drill bit
grinding machine model No. 4**

**One Asquith radial arm drilling
machine**

5' radius, 4' spindle to table height,
2" diameter drill bit. Automatic Power
Feed

One Pacera radial drilling machine

Up to ¾" drill

One Arboga Pillar drill machine

9" to column for ½" diameter drill

**Small pillar drills and hand drilling
facilities**

One Rems thread cutting machine

BSP up to 2" Bolts up to 1" W

**Tool grinding, off-hand grinding and
burnishing facilities**

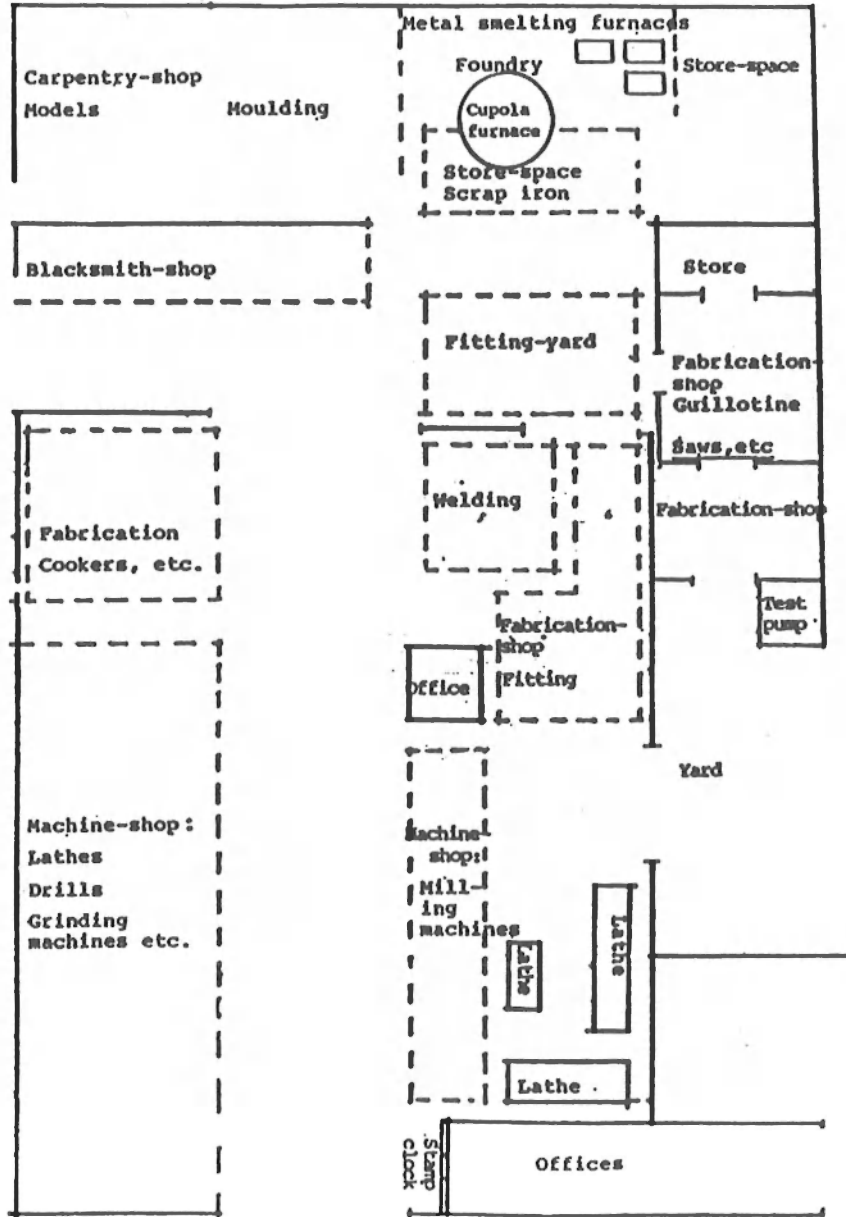
**One Rockwell bandsaw machine-
woodworking**

One manual hydraulic press
2 ton capacity. Adjustable bridge

One mobile hoist
½ ton lifting capacity

All facilities for making:
patterns, models, prototypes, moulds, jigs
and fixtures

Appendix E: Physical lay out of general engineering workshop,
Company 1



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