THE SHORTAGE
OF SKILLED LOCAL CRAFTSMEN IN THE
PROVINCE OF BALOCHISTAN:
STATUS, PROBLEMS AND A PROPOSED SOLUTION

BY

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DEPARTMENT OF EDUCATION
UNIVERSITY OF KARACHI
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STATUS, PROBLEMS AND A PROPOSED SOLUTION

by
Winfried Wolter

A Thesis submitted to the University of Karachi for the
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DEPARTMENT OF EDUCATION
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(Dr. M. Ismail Saad)
Director
To all those colleagues, Pakistanis and Germans, who did their utmost to make the project a success.
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I, especially, want to thank my adviser, Dr. Ismail Saad – Karachi University, for his academic guidance, Mr. Jawed Iqbal Khan, Principal T.T.C. Hno Chowki, for sharing his profound knowledge about the technical training in Balochistan with me, and Mr. Shulam Abbas Shah, Dy. Director Labour-Manpower, for accompanying me during the census 1987.

I also convey my thanks to my sons, to Klaus for his assistance in developing the electronic courses and their test runs, and to Peter for developing the computer software used in the apprenticeship scheme, as well as for his provocative remarks when reading the draft of this paper. Last, but not least, I want to thank my wife, Karin, who was always patient whenever I had to work at the computer in the evenings.
SUMMARY

Balochistan, one of the less developed provinces of Pakistan, has an area of 386,000 square km, which is approx. 46% of the total area of Pakistan. The 4.3 million inhabitants of the province represent only 5% of the total population. Besides Quetta, a town of approx. 300,000 inhabitants, the rest of the population is scattered over the province in small towns and villages. This low density of population, combined with a very slow development of the infrastructure and education, resulted in a low rate of literacy.

The Government of Balochistan has made an effort to improve the situation in the province by establishing an industrial estate at Hub Chowki (H.I.T.E.), using the existing infrastructure of nearby Karachi. Since there are hardly any resources of skilled labour for the modern industries among the Balochistanis, all skilled manpower, if needed, has to be trained by the industries, the training institutes, or hired from other provinces. One main task of the industrial estate is to provide job opportunities to the local people of Balochistan, and consequently a training centre was planned within the area, the Pak-German T.T.C. Hub Chowki

with the task to overcome

the shortage

of skilled local craftsmen in the Province of Balochistan.

When the writer was assigned to the post of an adviser at this centre, he felt, that on the one hand the complex task could be a suitable area of research work leading to a Ph.D. degree, on the other hand the project could benefit from a systematic research, which the writer intended to conduct mainly during his spare time.

Simultaneously to the the important task of receiving and installing the incoming equipment, and planning for the first intake of trainees, there was a need for a field survey on the industries in the Hub area, because six years had passed since the initial survey, being the base for the planning. The field survey was conducted in Jan. 87 through a census, with the following main aims:

~ Collection of necessary data about the industries and the development of the estate;

~ involvement of the H.I.T.E. industries in training activities;

~ determination of required skills/knowledge/trades for the industries;

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finding out the intention of the industries to participate in the training;

introduction of the newly established T.T.C. to the industries.

The method of research and the results are described in CHAPTER IV. Following, is a brief presentation of the results:

Industries depend by almost 100% on skilled labour from Karachi, with a commuting service vulnerable to disturbances in Karachi;

since skilled labour is readily available in Karachi, industries, at the time of the census, were not involved in training, except on-the-job training for limited tasks;

the development of the industrial estate is lagging much behind from what was planned originally;

the industries are willing to co-operate in a training scheme for local craftsmen;

the most badly needed local craftsmen are in the field of electrical/mechanical maintenance, as well as machinists. For the maintenance trades there is a request for special skills/knowledge, needed for the work in modern industries.

Consequently, one of the planned trades (millwright fitter) was dropped, new skills/knowledge to be taught were included in the training, and an institutional cum in-plant-training was planned for the area.

Before selecting the appropriate scheme of training for the Hub area, the writer found it necessary to get a comprehensive view of the technical training in Balochistan, and the findings are presented in CHAPTER II. The training institutes have many problems in common:

- Lack of tools, suitable equipment, and consumable materials;
- lack of qualified instructors;
- shortage of funds for the recurrent costs;
- insufficient number of trainees willing to join the training;
- duration of courses below the time prescribed by the NTB.

In view of these problems it was concluded that for the T.T.C. Hub:

- Participation of the industries must be received in the training scheme, to minimize the costs for tools, material, and machines;
- own efforts are necessary for the instructors' training.
- public relation campaigns are necessary to attract trainees;

This chapter also deals with the future development of the technical training under the the Second Vocational Training Project (World Bank), and its impact on the existing institutes, especially with regard to the recurrent costs, and the number of instructors needed to run the institutes.

CHAPTER III, in its first part, gives a comparative view at the educational/vocational systems in Pakistan, Great Britain, and the Federal Republic of Germany, showing the different approaches towards technical training. While the system in Britain is mainly based on the apprenticeship scheme, the German system stands for the dual approach, a combination of institutional and industrial training. Pakistan, influenced greatly by Great Britain, shows forms of apprenticeship training, but also institutional training. A combination of both, dual training, is only known in the Punjab and does not show the expected results. The second part of CHAPTER III elaborates on different organizational forms of vocational training, and finally results in a proposal of a suitable and applicable scheme of training for the Hub area. The scheme starts with a one year institutional training, followed by a period of institutional cum industrial training. The length of this period is not defined in CHAPTER III, because it should be adaptable to the changing conditions of education and industrial development.

Before preparing the courses and training software, the writer proposed a new National Occupational Skill Standard to the National Training Board NTB, based on the findings in the industries and on the existing curriculum/skill standard for electricians. Based on this proposal, the NTB prepared a new trade standard. The proposal was discussed, changed, and finalized by the committee appointed by the NTB. The result can be found under Appendix II/1. Taking into consideration

- the requirements of the industries,
- the requirements for the trainees,
- the occupational skill standard, and
- the proposed training scheme,

in CHAPTER VII "course outlines" for the basic level (Grade III) and the intermediate level (Grade II) are developed. Since the formulation of the objectives is left to the committees of the NTB, the "course outlines" include the topics to be taught, the time allocation, flow of training, connection between theory and practical training, places of learning, and the interlinking with the industries. Since theoretical learning and practical training take place in two different location (places of learning), even three when considering the industrial training, their relation could have easily been lost. To overcome this problem, the
theoretical training is centered around the lab. classes, in order to give a meaningful, practical approach. The "course outlines" are introduced, and their approach and contents is well accepted by the trainees, the instructors, and the technical management of the industries.

CHAPTER V presents the aims, methods, and results of a short survey of 24 companies within the industrial area, conducted in Feb. 88. The companies were selected under the aspect that they should be suitable and willing to participate in the training scheme. The survey was done by personal visits, as the census in 1987, and revealed, as a result, the number of industrial training places, the common date of starting the training, as well as the release system for the up-grading classes in the institute.

CHAPTER VI monitors the initiation and promotion of the technical training scheme in the Hub area. The topics covered are as follows:

- Recruitment and selection of the first intake, July 1987, including the political problems during the selection, and a follow-up of the trainees;

- recruitment and selection of the second intake, August 1988, including a follow-up of the trainees, and an appraisal of drop-outs;

- organization of a public relation campaign with the aim to attract more local youngsters to the technical training;

- measures to introduce the institute and its training scheme to the industries;

- evaluation of the institute and its training scheme, the problems indicated, and proposed measures;

- the proposal of a revised training scheme as an answer to the problems, faced during the implementation phase of the industrial training.

CHAPTER VIII winds up the paper with a summary, but especially with recommendations for the second project period 1990-93. It concludes with a list of tasks to be approached, and problems to be solved during that project period with the main headings:

- Selection of instructors;

- instructors' training;

- recruitment and selection of trainees;
- in-plant training;
- recurrent costs;
- improvement of the living conditions for instructors/trainees.

It is the final conclusion of the writer, however, that the Pak-German Technical Training Centre and its training scheme is one feasible way of providing skilled local manpower to the industries, and to overcome the unemployment problem of the youngsters in the Province of Balochistan.
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CHAPTER I

THE PROBLEM AND THE DEFINITIONS OF TERMS USED

Balochistan, one of the less developed provinces of Pakistan, has an area of 386,000 square km, which is approx. 46% of the total area of Pakistan. The 4.3 million inhabitants of the province represent only 5% of the total population. Besides Quetta, a town of approx. 300,000 inhabitants, the rest of the population is scattered over the province in small towns and villages. This low density of population, combined with the neglect of the province by the Federal Government over a long time, resulted in a very slow development of the infrastructure and education, with a low rate of literacy (6.2% for the rural areas, with 9.2% for the males, and 1.8% for the females). 1)

The labour force of the province (10 years and above), is mainly divided into the following occupations:

<table>
<thead>
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<th>Occupations</th>
<th>Rural</th>
<th>Urban</th>
<th>Total</th>
</tr>
</thead>
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<tr>
<td>Agriculture, forestry, fishing</td>
<td>64 %</td>
<td>9 %</td>
<td>57 %</td>
</tr>
<tr>
<td>Community-, social-, and personal services</td>
<td>9 %</td>
<td>21 %</td>
<td>11 %</td>
</tr>
<tr>
<td>Trade, restaurants, hotels</td>
<td>7 %</td>
<td>30 %</td>
<td>10 %</td>
</tr>
<tr>
<td>Transport, storage, communication</td>
<td>5 %</td>
<td>9 %</td>
<td>6 %</td>
</tr>
<tr>
<td>Construction</td>
<td>4 %</td>
<td>6 %</td>
<td>6 %</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>4 %</td>
<td>15 %</td>
<td>5 %</td>
</tr>
</tbody>
</table>

Distribution of Labour Force 2)  Table I/1

The labour force, occupied in the manufacturing sector in the rural areas, can be again subdivided as follows:

<table>
<thead>
<tr>
<th>Total</th>
<th>Employers</th>
<th>Self-employed</th>
<th>unpaid Family Helpers</th>
<th>Employees</th>
</tr>
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<tr>
<td>3.75 %</td>
<td>--</td>
<td>2.07 %</td>
<td>0.39 %</td>
<td>1.29 %</td>
</tr>
</tbody>
</table>

Labour Force in the Manufacturing Sector 1) Table 1/2

The foregoing figures of employment and education show that there are hardly any resources of skilled labour for the modern industries among Balochistanis. If needed, all local skilled manpower has to be trained by the industries, the training institutes, or hired from other provinces.

The Government of Balochistan has made an effort to improve the situation in the province by establishing an industrial estate at Hub Chowki (H.I.T.E.), using the existing infrastructure of nearby Karachi. Hub Chowki is situated at the R.C.D. Highway Karachi - Quetta (approx. 800 km south of Quetta), providing access to Karachi, with only 35 km to the heart of the city and even less to its port facilities.

The project was initiated in 1978 and covers an area of 1100 acres. Industries in the following categories were planned: Iron and steel, chemical and allied industries, electrical and light engineering, less polluting and less mechanised industries, small-scale industries - spread over different sectors of the area. Besides a large residential area, the necessary infrastructure such as schools, hospitals, banks, shopping centres, sports facilities etc. were planned.

The project was designed to attract 800 factory units with approx. 15,000 production oriented work places and 5,000 to 7,000 more as administrative and supporting staff. In order to facilitate this, a five-year-tax holiday is offered after the start of production. This process was to be intensified by making the complete infrastructure readily available. 2)3)

Once the estate has been established, it is expected that more companies will be attracted by the possibility of cooperating with the existing ones. The broad diversity of products within the estate provides an excellent opportunity for an exchange of products and goods between the companies, avoiding long distances with costly transport. As mentioned above, the industrial

2) Appraisal Study, German Agency for Techn. Co-operation (GTZ), 1982
3) Source: Fifth Five-Year-Plan 1978 - 1983
estate was supposed to create thousands of jobs for the local people (according to the plan, 75% of employees on all levels must be Balochistani). However, it turned out that almost all employees, from above the unskilled workers up to the managers are from Karachi or other provinces. Only unskilled labour is drawn from the local people. Reasons are the shortage of skilled Balochistani craftsmen, suitable for the modern industries, and the ineffective and delayed set-up of the infrastructure, especially the housing project.

Statement of the Problem

The questions which this study attempted to answer, are the following:

1. What are the status and the capacity of the institutional technical training in Balochistan?

2. How far have the Hub Industrial Trading Estate (H.I.T.E.) and nearby industries, compared to the initial development plans of the Government of Balochistan, really developed?

3. What is the demand of the industries in the Hub area, qualitative and quantitative, with regard to apprentices?

4. To what degree do the industries in the Hub area participate in the proposed apprenticeship scheme?

5. How could an apprenticeship training scheme in the Hub area be effectively introduced?

6. What is the contents of learning and the organization of the scheme?

Importance of the Study

The high unemployment rate in Balochistan, together with the vulnerability of the industries in the Hub area caused by disturbances in Karachi (in case of disturbances the commuting employees do not reach Hub Chowki, leaving all the factories closed) ask for a training of Balochistanis for these industries. Since an efficient, purely institutional training is out of the financial reach for the Government of Balochistan, an institutional-cum-apprenticeship training was to be the answer to these problems.

...no country, no society is economically in a position to provide all its citizens, and above all young people, with suitable professional education organized in schools. 1)

1) Karing P., How can the training capacity of factories be utilized in full, DSE Mannheim 1986 p.11.
THE PAK-GERMAN TECHNICAL TRAINING CENTRE (P.G.T.T.C.) HUB CHOWKI

was jointly planned and started by the Government of Balochistan (Directorate Labour-Manpower DLLM) and the German Agency for Technical Co-operation (GTZ) on behalf of the Government of the Federal Republic of Germany, to provide for an adequate training.

Such a training scheme can give a broad basic training at the institute to compensate for shortcomings in the industries, resulting from their specialized production. Furthermore will this broad basic training ensure a high grade of flexibility for the future skilled workers. The apprenticeship part will avoid a training far from industrial needs. Hence, the government and the industries will share the financial burden, and more interest in the individual trainee will be the result.

After the completion of the apprenticeship, the former trainees can be absorbed by the local industries. Eventually the newly established T.T.C. will produce more skilled manpower than needed in Hub Chowki, making them available for the whole province and even labour export.

Deslimation of the Study

Since the Techn. Training Centre offers institutional- and apprenticeship training for different mechanical and electrical trades, this study is limited to the following areas:

1. Technical Training Institutes in Balochistan: their aims, capacities, actual utilization, and future development plans.

2. Demands for trades, skills and number of apprentices in the industries at Hub Chowki.

3. Methods of initiating and promoting the apprenticeship training scheme to the industries and the future apprentices.

4. Organization of the apprenticeship training scheme as an interaction between workplace and training institute.

5. "Course outlines" for the institutional part of the training scheme, limited to the electrical trade.

Method of Procedure and Sources of Data

1.1. Interviews with various officers of the Department of Labour and Manpower, Government of Balochistan;

1.2. Study of statistics and reports made available by the above mentioned department;

1.3. Study of related masters' theses at the University of Balochistan in Quetta and Karachi;
1.4. Visits to various institutes in Balochistan;

2.1. Interviews with officers of the H.I.T.E. Development Agency, Hub Chowki;

2.2. Census of the industries at H.I.T.E. covering 100% of the companies;

2.2.1 Interviews with the general-, production-, and personnel managers of the industries;

2.2.2 Questionnaire, inquiring about the demand for trades, skills, and number of apprentices;

2.3. Field survey of a selected group of companies:

2.3.1 Interviews with the production- and personnel managers;

2.3.2 Questionnaire, asking about the actual demand for apprentices of the first batch, joining their industrial training places in July 1988;

2.4. Follow-up visits to the trainees in the companies, observing the work situation for skills in need, use of an observation sheet;

3.1. Take the opportunity of the census 87 and filed survey 88 (2.2.-2.3.) to introduce the apprenticeship training scheme to the managers;

3.2. Written descriptions of the programme and posters to be submitted to the companies;

3.3. A seminar in collaboration with the National Training Bureau, Islamabad, introducing the apprenticeship training scheme to the invited representatives of the industries;

3.4. Visit to secondary schools, presenting the programme to the principals and matric/middle passes students;

3.5. Distribution of posters within the province;

3.6. Organization of a public relation campaign through the Las Bela district;

3.7. Participation in the evaluation and planning workshop 1989;

4.1. Organisation of the release system;

4.2. Definition of the contents for the up-grading courses in collaboration with the workshops, following the needs of the industries as well as the apprentices;
4.3. Visits to the trainees during their time in the factories, observing their progress;

4.4. Promotion of an advisory committee;

5.1. Preparation of "Course Outlines" for maintenance electrician (industries), based on the existing curriculum for electricians, the needs of the industries (2.2), and the new "National Occupational Skill Standard for Maintenance Electrician (Industries)", which was initiated by the writer and published by the National Training Bureau (NTB) in Islamabad.

5.2. Submitting the "Course Outlines" to the National Training Development Institute as a base for a national curriculum.

Definitions of Terms/Abbreviations used

Definitions of terms are presented here, as to provide a clearer understanding of what is discussed in this study. The definitions are mainly taken from the "Glossary of Selected Terms", International Labour Office (ILO), Geneva, because they are accepted widely, and hence make a discussion much easier. Parts of the definitions which do not apply to this study are put into parenthesis ( ...).

Apprenticeship

A period of long-term training substantially carried out within an undertaking and (often) with related compulsory classroom instruction. It is regulated by statutory law (or custom) according to a written (or oral) contract which imposes mutual obligations on the two parties concerned. 1)

Block Release

Authorised absence of the trainee from work with (or without) pay, to attend courses of related occupational instruction (and/or general education), constituting part of his training programme for a number of weeks (or months) at a stretch each year. 2)

Curriculum

A curriculum is an organized set of formal educational and/or training intentions. 3)

Inplant-Training

Training, including apprenticeship, given at a workplace in order to impart technical and practical knowledge through the execution of relevant tasks. 1)

Institutional Training

Any training that is provided in a technical or vocational school, in a vocational training centre or similar institution where both theoretical and practical training are conducted. 2)

Educational Objectives

By educational objectives, we mean explicit formulations of the ways in which students are expected to be changed by the educative process. That is, the ways in which they will change their thinking, their feelings, and their actions. 3)

Skilled worker

For this term two definitions are selected, one from the National Training Bureau with a more legal aspect, and one from the International Labour Organisation with a more qualitative aspect. Both of them are applied, simultaneously, in this study.

- A person who has acquired the full qualifications needed to perform a recognised trade or other occupation. 4)

- It relates to the level of knowledge and skills expected from craftsmen who have completed two years of full-time institutionalized training programme, conducted according to this standard or from those, who have passed the trade test at Basic Level-Grade III followed by two years of relevant "on-the-job" experience; or those, who have already gained four years "on-the-job" experience relevant to this trade. 5)

National Occupational Skill Standard

The Occupational Skill Standard referred to, relates specifically to workers at craft level and is directly related to the skills, equipment, tools and materials in common use in Pakistan at the present time. 6)

1) Vocational training: Glossary of selected terms, International Labour Organisation (ILO), Geneva, 1986, p.34
2) Ibid., p.35  4) Ibid., p.66
6) Ibid., p.5
Training Scheme

Provisions made to develop a specific learning activity for a particular category of people either at (national), regional, sectoral or plant levels. 1)

Vocational Training

Activities which aim to provide the knowledge, skills and attitudes required for effective and efficient performance within an occupation or group of occupations. 2)

Two explanations are given, which are important for the understanding of the situation in Hub Chowki:

Residence Certificate

A "residence certificate" is provided to people living in the province of Baluchistan since a certain time.

Local Certificate

A "local certificate" is provided to members of families, who have been living in Balochistan since generations. ("sons of the soil", also called "Balochistanis")

Abbreviations

ATC = Apprenticeship Training Centre
BSO = Balochistan Students Organisation
DLM = Directorate Labour Manpower
H.I.T.E. = Hub Industrial Trading Estate
ILO = International Labour Organisation
MA = Machinist
ME = Maintenance Electrician
MM = Maintenance Mechanic
NSTI = National Staff Training Institute, Islamabad
NTB = National Training Board
TTC/VTC = Technical/Vocational Training Centre
UNHCR = United Nations High Commissioner for Refugees

CHAPTER II

INSTITUTIONAL TECHNICAL TRAINING IN THE
PROVINCE OF BALOCHISTAN

The writer's attempt to survey the development of the institutional training in Baluchistan, unfortunately remained incomplete, due to lack of reliable statistical material, change of departments and their responsible officers, lack of documentation within the institutes, and sometimes the understandable attempts to cover-up unfavourable facts. Though displaying some adverse situations, it is not the intention of the writer to blame the administration or particular persons, but to identify the problems and draw conclusions to benefit the own project, the Pak-German T.T.C. Hub Chowki.

Aims of the Survey:
- describe the development of the institutional training in Baluchistan, including the problems of recent times;
- describe the status (trades, capacity, etc.) of the institutes;
- define problems and short-comings at the institutes;
- describe the future development plan for new institutes;
- define problems for the future developments;
- draw conclusions from the findings for the implementation of the training scheme at Hub Chowki.

Method of the Survey, Sources of Data

Due to lack of reliable statistical material, etc. it was decided to visit most of the institutes personally, interview their principals (refer to appendix II/1), and inspect the classrooms and workshops. Further sources have been tapped, too:

- interviews at the Department of Labour and Manpower;
- statistical material of that department;
- Aide Memoire - IDA Appraisal Mission 1985;
- interviews with ILO representatives;
- FC-I Second Vocational Training Project.
Development in the Past and the Present Status

The development of the institutional training started off with the introduction of technical subjects in some high schools in the sixties under the Colombo Plan of 1962, financed by the USA AID. The equipment was supplied by the US AID, as well.

1962 Government Pilot High School, Sibi
1964 Government Pilot High School, Mastung
1962 Technical High School, Quetta
1965 Government Polytechnic Institute, Quetta

In addition to these high schools and the polytechnic institute, two Government Vocational Institutes were established:

1968 Government Vocational Institute, Khuzdar (T.T.C. Khuzdar)
1968 Government Vocational Institute, Loralai (T.T.S.C. Loralai)

All these institutes were initially placed under the supervision of the Department of Education. To strengthen the Technical Training, two T.T.C.s, one VTC, and one T.T.C. Women were started under the Department of Labour and Manpower:

1980 Technical Training Centre, Quetta
1986 Vocational Training Centre, Kila Abdullah
1987 Technical Training Centre, Hub Chowki
1989 Technical Training Centre for Women, Quetta

The Government Pilot High School in Sibi

Imparts training in the electrical, metal, woodwork, commerce, and agricultural trades - the electrical trade being the students' favorite. During class VI to X each student selects his trade and gets 4 training sessions/week in this trade, summing up to approx. 700 periods within the 5 years. This is even less than half of what is required by the Provincial Training Board for the training towards a semi-skilled worker. In each of the five trades, 35 students are enrolled, resulting in 175 students altogether. Actually, there are 500 students within classes VI to X and therefore, the school can only be considered as a high school with a technical stream. A personal visit to the workshops revealed that the typing room can be considered as functioning, the woodwork and metal sections as fairly well equipped, while the equipment of the electrical workshop can be considered as nil. In 1970-75 the school was used for welding crash-courses, which were abandoned later, due to lack of material.
According to the principal, the main problems lie within the supply of training materials and the replacement of unserviceable tools. Own observations revealed, that the quality of the instructors is a problem too, because the training done can only be considered as pretechnical, lacking the standard of a technical trade training completely.

The Government Pilot High School, Mastung,

in the beginning had a similar set up as the one in Sibi, but here the training has stopped and all the equipment has disappeared. A revival would only be possible, if the school was supplied with a complete set of new equipment.

The Technical High School in Quetta

could not be visited by the writer. According to information received, the set-up and the problems are similar to Sibi.

The Government Polytechnic Institute in Quetta

started in 1965 in the buildings of the Technical Secondary School and moved to its present modern buildings in 1969. This institute falls under the Department of Education and offers training in three trades: Electrical, Mechanical, and Civil, with a training capacity of 40 students for each trade and year. The training of the three year courses takes approx. 4 years and leads to the Diploma as an Associate in Engineering. The recruitment of students is no problem and admission is granted on a quota system for the different districts of the province. According to the curricula, 66% of the training is devoted to practicals, though two facts speak against this:

- when visited, the workshops gave a deserted impression;

- the understanding of "practical" is a bit unusual: for e.g. "visiting a street light arrangement and writing a report on the visit" falls under practical training according to the curriculum, whereas real skill training is left aside.

It is not the aim to discuss the curriculum, but to show the difference between what is written and what is actually done. Educated in the described manner, graduates serve as instructors for theory and practice at the technical high schools and the T.T.C.s/VT.C.s.

Further problems are lack of consumable materials, tools, and qualification of the instructors. For the latter, training was planned since long, but has not been implemented up to now. In 1975, plans were made for extending the programme towards electronics and refrigeration/airconditioning - the buildings were set up under financial assistance of the Asian Development Bank, but the workshops are not yet equipped.
The Government Vocational Institute in Khuzdar (T.T.C. Khuzdar)

was established under the Department of Education in 1968, working up to 1980 with instructors, but without trainees, funds, and any pass-outs. From 1975 to 1979, the school was used for short-term crash courses.

In 1981 the T.T.C. was taken over by the Department of Labour and Manpower and revived as a T.T.C. under the First Vocational Training Project, financed by the World Bank and training started in 1982. The T.T.C. was closed again from 1985 to 1987 for reconstruction. During this time, equipment was supplied by the ILO under this training project. Training started, again, in March 1987, with the attempt to offer a day and an evening shift. Since there was no demand for a day shift (the would-be trainees hold a job in the bazar, in government offices or go to school), the T.T.C. is utilized, daily from 3:00 to 6:30 p.m. only, what includes the breaks. The training ends with the Trade Test Grade III. The total number of training hours sum up to approx. 800, what is half of the requirement for the Trade Test Grade III, according to the Provincial Training Board. Presently, training is done in 9 different trades and is imparted according to the ILO curricula.

<table>
<thead>
<tr>
<th>Trade</th>
<th>Duration</th>
<th>Training Places</th>
<th>Actual Intake</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Electrical</td>
<td>1 year</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>2. Radio/TV</td>
<td>1 year</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>3. Civil Draftsman</td>
<td>1 year</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>4. Refr./Aircon.</td>
<td>1 year</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>5. Welding</td>
<td>1 year</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>6. Plumbing</td>
<td>1 year</td>
<td>18</td>
<td>19</td>
</tr>
<tr>
<td>7. Machinist</td>
<td>1 year</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>8. Woodwork</td>
<td>1 year</td>
<td>20</td>
<td>19</td>
</tr>
<tr>
<td>9. Auto/Diesel</td>
<td>1 year</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

Khuzdar: Trades and Intake 88

Table II/1

The problems named were lack of hand tools, consumable materials, and suitable equipment. Except in two trades, the instructors' qualification were considered as sufficient. When visiting the workshops, training had started with the basic skills in all trades and trainees were actively working in the well kept
workshops. A closer look revealed that for the forthcoming training there was virtually neither a single welding rod, nor any gas available. The cylinders were leaking and therefore empty.

During the reconstruction phase a lot of modern equipment had arrived and partly been installed. For example a colour TV trainer and an FM stereo radio trainer for the radio/TV section, but there is no stereo transmission all over Pakistan; gas heaters and cookers for liquid gas for the plumbing section, but no gas cylinders are available; a cut-away model of a 6-cylinder Mercedes engine for the automotive section, but not even a single engine in working condition for the training; special gas shielded welding equipment for the welding section, but no special gas and no trained instructor to use the equipment. Although ones complaining could proceed the problems are obvious:

- Donor agencies provided sophisticated equipment without proper training on how to use it, without survey of the suitability of the equipment in the area, and without providing funds for the high recurrent costs.

- The Department of Labour and Manpower accepts equipment without considering the usefulness, its necessity for the training, and the recurrent costs.

The Government Vocational Institute in Loralai (T.T.S.C. Loralai) was established in 1966, under the Department of Education, but left without any instruction activities until 1981. There even were no buildings and the equipment was shifted from place to place. Under the First Vocational Training Project, the institute was taken over by the Department of Labour and Manpower as a Technical Training and Service Centre in which construction activities finally started. The training commenced in 1982 and is offered in six different trades leading to Trade Test Grade III.

<table>
<thead>
<tr>
<th>Trade</th>
<th>Duration</th>
<th>Training Places</th>
<th>Actual Intake</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Auto Trade (heavy)</td>
<td>1 year</td>
<td>20</td>
<td>14</td>
</tr>
<tr>
<td>2. Farm machinery</td>
<td>1 year</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td>3. Electric</td>
<td>1 year</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>4. Woodwork</td>
<td>1 year</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>5. Welding</td>
<td>1 year</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>6. Turning</td>
<td>1 year</td>
<td>-</td>
<td>0</td>
</tr>
</tbody>
</table>

Loralai: Trades and Intake 88 Table II/2
In March 88, the number of pass-outs for the first 2 trades was 11 trainees all together, for the 3rd trade (electrician), the number was not available and the rest of the trades had no pass-outs in 1988. The institute receives support from the Federal Republic of Germany, rendered for the first and second trade through the "Hans-Seidel-Foundation", a foundation of one of the political parties in West Germany.

The problems mentioned were: lack of trainees willing to join the training and lack of consumable materials. When visiting the different sections, it turned out that trades 1 and 2, sponsored by the foundation, had fully equipped workshops, labs, and a library. The workshops for trade 3 and 4 were in working condition, while the equipment of the workshops 5 and 6 can only be considered as highly insufficient.

The Technical Training Centre in Quetta

was founded, in 1980, as a project of the Province of Balochistan under the DLM. In 1982 the German Agency for Techn. Cooperation (GTZ) started to assist the institute on behalf of the Government of the Fed. Republic of Germany. Right from the beginning the assistance was meant for the Afghan refugees, but was soon changed to the affected population, Pakistani and Afghani. Training is imparted for 8 trades in the day and evening shifts.

<table>
<thead>
<tr>
<th>Trade</th>
<th>Pakistani - Trainees</th>
<th>Afghani - Trainees</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>enrolled</td>
<td>drop-out</td>
</tr>
<tr>
<td>1. Woodwork</td>
<td>*</td>
<td>12 (22)</td>
</tr>
<tr>
<td>2. Steel construction</td>
<td>21 (22)</td>
<td>3 (2)</td>
</tr>
<tr>
<td>3. Machining</td>
<td>*</td>
<td>18 (18)</td>
</tr>
<tr>
<td>4. Machine fitter</td>
<td>*</td>
<td>21 (23)</td>
</tr>
<tr>
<td>5. Automechanic</td>
<td>*</td>
<td>20 (28)</td>
</tr>
<tr>
<td>6. Plumber</td>
<td>- (23)</td>
<td>- (5)</td>
</tr>
<tr>
<td>7. Draftsman</td>
<td>16 (--)</td>
<td>2 (-)</td>
</tr>
<tr>
<td>8. Electr. Grade III</td>
<td>*</td>
<td>21 (23)</td>
</tr>
<tr>
<td>Total</td>
<td>129 (159)</td>
<td>24 (30)</td>
</tr>
</tbody>
</table>

Legend: numbers stated for the day shift
numbers in ( ) for the evening shift
* trades supported by GTZ

Quetta: Trades and Intake 88 , Table II/3
The institute offers courses for Pakistanis (7 courses) and Afghans (3 courses) during the day shift, whereas the evening shift is meant for Pakistanis only. The duration is one year and the courses lead to the Trade Test Grade III. Training towards the Trade Test Grade II (second year) is only done for the electrical trade.

Intake: 10 - Pass-out: 3

The classes had to be abandoned due to lack of enrollment, and training is now done by modules, offered on demand in the evening shift.

The problems at the T.T.C. Quetta are:

- lack of maintenance funds;
- lack of well qualified instructors;
- lack of trainees (267 trainees in a city with 300,000 inhabitants is a very small number only)
- the fact that the evening shift works for 3 hours only, resulting in approx. 40% of the hours prescribed for the Trade Test Grade III, only.

The Vocational Training Centre in Kila Abdullah started, in 1983, as a co-project of the Directorate Labour Manpower and the UNHCR with the following trades:

turning  plumbing  welding  electrical  woodworking

The VTC provided training on a 50% quota system for Pakistani and Afghani trainees. In 1986 the VTC was handed over completely to the DLM and has since then educates Pakistani trainees, only. The institute works in day shift, only, and courses take 1 year, leading to Trade Test Grade III. The main problems at the VTC are:

- lack of consumable material;
- lack of well qualified instructors;
- the institute takes trainees below middle-pass, but provides the Trade Test III certificate in contrary to the regulations of the Trade Standards;
- during the day shift, the training only takes 3 hours per day, summing up to approx. 40% of the prescribed length of training required for the Grade III certificate.
The Technical Training Centre for Women in Quetta

has been planned for several years and buildings are ready since 1987. The start was postponed, again and again, and by 1/90, training has not yet started, although all official statements announced its commencement.

The electricity supply has not been connected, but equipment has come in, financed by the World Bank, under the Second Vocational Training Project. The equipment is not installed — only stored away.

Courses will be offered in the following trades, lasting for one year and leading to the Trade Test Grade III:

- embroidery/knitting
- computer operator
- * architectural drafting — total output: 120 per year
- * household appliance repair
- telephone/telex operator
- * secretary

*= equipment supplied in the 1st equipment cycle

Selecting these trades is an effort to introducing vocational training, for women, in non-traditional fields where wage employment (income generation) may be possible; considering the traditional problem, for women, to take employment outside their home. The W.T.T.C. is to be considered as a pilot project, and the extension to other centres, in the province, will only be considered after the acceptance is verified. The present problems are:

- electricity is supply not connected
- administration staff (incl. principal) is not appointed
- lack of well qualified instructors

Youth Vocational Centres

Since Nov. 1987, the Department of Labour and Manpower has tried to start nine Youth Vocational Training Centres for females and nine for males. The project is financed by the Ministry of Tourism and Culture, Youth Affairs Division, Central Government.

VVTC for Females:

Quetta Punjub Kharan Kalat
Dera Bugti Loralai Kohlu Nasirabad Dhader
Training is imparted in cutting and knitting and has started in all centres, but two. Local women, who know the trade, are employed on temporary basis and use residential buildings. The duration of the course is 6 month and a stipend of 200.-- Rs is paid.

YVTC for Males:

Quetta  Sibi   Kalat   Kosh Kalat   Punjur
Zhob    Dal Badin  Khanzai  Bela

Training is planned at all centres for tractor mechanics, electricians, auto mechanics and had started, for 6 month, in Quetta before the training stopped, again. Training has not commenced at other centres, yet. In Sibi one residential house, unsuited for this purpose, has been rented and a signboard been set up. Up to now, no instructors have been appointed and it seems, that the programme does not get the attention, it needs, in order to function.

Vocational Training for Refugees

Although this kind of training cannot be considered as part of the institutional training in Baluchistan, a brief description is given to provide a comprehensive picture of the situation:

Besides the training for Afghans at the T.T.C. Quetta, the ILD/UNHCR provide training for approx. 840 trainees in 6 static and 6 mobile (tents) centres. The training is intended to prepare the refugees for their return home after the war. Trades are mainly related to house construction (woodworking, plumbing, masonry, steel construction), in order to prepare the people for the reconstruction of their homes. Up to 1988, 6 month courses were offered, while since 1989, the duration is shortened to 4 month. This was meant as a signal of hope for an early return back home. Since this cannot be envisaged, Afghani workers enter into the labour market and work below the normal wages, because they receive their basic needs free of charge from the UNHCR -- social unrest in different areas is the result.

Future Planning

The development, within the next years, follows two directions:

1. Additional training centres under the Second Vocational Training Project of the Federal Government, financed through the World Bank;

2. two additional training centres as a provincial initiative.

1. The main aim of the Second Vocational Training Project is to improve the quality and expand the capacity of the National Voca-
ional Training System.

The "system expansion" objective would be achieved by (a) new courses and equipment in the existing institutes, (b) developing new institutes, and (c) expanding the apprenticeship programmes. The "quality improvement" objective would be achieved by (a) strengthening instructor training programmes, and (b) further strengthening of the management and project implementation capacity of the National and Provincial Training Boards.

Out of the total number of 31 new Training Centres in the country, five will be located in Baluchistan:

<table>
<thead>
<tr>
<th>Trade/Place</th>
<th>Nushki</th>
<th>Dera Marad</th>
<th>Jamali</th>
<th>Mastung</th>
<th>Gwadar</th>
<th>Pishin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welding</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Automotive</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Electrical</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Radio &amp; TV</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auto Farm Mech.</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turner</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

Trade and Places of new Centres 1) | Table II/4

The courses will have a duration of one year, leading to Trade Test Grade III for semi-skilled worker. The capacity will be 16 trainees for each trade, summing up to a total capacity of 80 trainees per training centre. Each of them will have 8 staff members (Principal, 2 senior instructors and 5 instructors). Senior instructors and instructors are expected to be diploma holders or equivalent, with experience, and would have to undergo a 48-week instructor training programme prior to their appointment. 2)

Contradicting these numbers are the ones, given in the PC-I of the National Training Bureau: Capacity of 100 trainees for each centre with 17 staff members (Principal, 2 chief instructors, 4 senior instructors and 10 instructors) for the morning shift, and 8 staff members (1 chief instructor, 2 senior instructors, 5 instructors) for the evening shift. 3) The total staff necessary (instructor to principal) would count 40 for the World Bank Report version and 125 for the PC-I version. These numbers will be referred to after the next sub-chapter.

1)2) Source: World Bank Report (Appraisal Mission to Pakistan, 85)
3) Source: National Vocational Training Project Phase II, PC-I
   Islamabad: National Training Bureau-Manpower Div., June 1986
2. Summary of a Feasibility Study for two new Trainings Centres

The feasibility study was undertaken by the writer in order to advise the Ministry of Economic Cooperation of the Federal Republic of Germany on its possible involvement in these projects. Only a summary is given to clarify the most crucial points and their relation to the ongoing project in Hub Chowki.

The new T.T.C.s are planned by the Provincial Government in the towns of Sibi and Turbat, both places being district capitals and not covered by the Second Vocational Training Project (World Bank). By the time of the visit (11/88) the buildings in both places were almost completed, except for the electricity supply, the water supply, and the equipment. There was a request for assistance on the equipment purchase.

<table>
<thead>
<tr>
<th>Place/Trades</th>
<th>Automotive</th>
<th>Electric</th>
<th>Welding</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>III II</td>
<td>III II</td>
<td>III II</td>
<td>III II</td>
</tr>
<tr>
<td>Turbat</td>
<td>16 8</td>
<td>16 8</td>
<td>16 8</td>
<td>48 2</td>
</tr>
<tr>
<td>Sibi</td>
<td>16 8</td>
<td>16 8</td>
<td>16 8</td>
<td>48 24</td>
</tr>
<tr>
<td>Total</td>
<td>32 16</td>
<td>32 16</td>
<td>32 16</td>
<td>96 48</td>
</tr>
</tbody>
</table>

Table II/5

When visited, the trades were already selected and the number of the teaching staff required was allotted with 8 for each centre (principal, chief instructor, 2 senior instructors, 4 instructors) summing up to 16 posts of grade 14 and above. 2)

In order to find a recommendation, the following aspects were considered:

- needs of the local "industries";
- needs of the youngsters in the area;
- need for instructors;
- recurrent costs.

A brief survey revealed that there are virtually no industries at Sibi and Turbat. Hence, no demand could be deduced. The local workshops in the bazar claimed no demand and explained the training of their own staff through the "chotu" system (chutu

1) PC-I, Training Centres in Sibi and Turbat, DLM Quetta
means short/small). Under this traditionally established system, boys start to work, at a workshop, at approx. 12 years of age and learn by doing for about 3 - 7 years, depending on the trade and their aptitude. None of the workshop owners wanted to change this system.

From both towns, the survey of the existing schools revealed a high number of children and youngsters attending classes:

**Turbat (District):**

<table>
<thead>
<tr>
<th>Type</th>
<th>(Class)</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Degree College</td>
<td>(B.A. Degree)</td>
<td>6 students</td>
</tr>
<tr>
<td>1 Intermediate College</td>
<td>class 11 and 12</td>
<td>122 students</td>
</tr>
<tr>
<td>8 High Schools</td>
<td>(up to class 10)</td>
<td>2042 students</td>
</tr>
<tr>
<td>22 Middle Schools</td>
<td>(up to class 8)</td>
<td>3275 students</td>
</tr>
<tr>
<td>161 Primary Schools</td>
<td>(up to class 5)</td>
<td>3862 pupils</td>
</tr>
</tbody>
</table>

**Sibi (District):**

<table>
<thead>
<tr>
<th>Type</th>
<th>(Class)</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Intermediate Colleges</td>
<td>class 11 and 12</td>
<td>229 students</td>
</tr>
<tr>
<td>9 High Schools</td>
<td>(up to class 10)</td>
<td>2574 students</td>
</tr>
<tr>
<td>16 Middle Schools</td>
<td>(up to class 8)</td>
<td>1422 students</td>
</tr>
<tr>
<td>119 Primary Schools</td>
<td>(up to class 5)</td>
<td>2904 pupils</td>
</tr>
</tbody>
</table>

Source: Statistical material provided by the Department of Labour and Manpower

In order to get one own impression and to verify the figures provided, two intermediate colleges, and five high- and middle schools were visited, personally. One example can demonstrate the findings: The Intermediate College, in Turbat, has 122 students according to the statistical material, but in reality, it has 216 in class 11 and 265 in class 12. The total number of students having passed the last final tests was only 23. For the high schools, the pass-rate of the final exams was very low, too.

The high number of students in the schools, the low pass-rate during the final exams and the complete absence of employment opportunities, except in government service, ask for alternative training opportunities. Such an alternative could be the planned training centres. One has to keep in mind that the skills acquired, in these centres, will not lead to employment in the two districts, but to a migration to places with a higher demand for skilled labour (the Hub area within the province, other industrial centres in Pakistan and the Middle East). The additional training provided by the centres will not be the reason for a migration, because even for unskilled labour, there is no chance of work in the two districts. It will provide a chance for the youngsters to earn their living and escape the common destiny of unskilled people in the province: poverty because of no job.
Recommendation:

Having the young people in mind, the study resulted in the recommendation to support the two T.T.C.s under the following conditions:

- Drop the institutional training towards Grade II, utilize the free capacity for more youngsters, and offer courses in modular system towards Grade II, only on demand;

- Utilize the training capacities for short-term courses in the evenings; offered to the local craftsmen as a direct benefit for the community;

- Recruitment of local people as instructors (successful pass-outs of the intermediate classes?) and send them for an instructor training of at least 24 month (this move should avoid the tendency towards a post in Quetta and the resulting absenteeism from the place of duty);

- Finalize the installation, as well as water and electricity supplies up to working condition;

- Purchase of equipment only after the instructors are selected, are sent for training, and the installations are ready.

Support was recommended in the following fields:

Curricula development, workshop lay-outs, equipment lists, organization of training, tests, purchase of equipment, and instructor training. Furthermore it was recommended to take over part of the recurrent costs in relation to the sum provided by the Provincial Government.

Result:

The authorities did not follow the recommendation. The main reason given, was the lack of instructors in the existing T.T.C.s, as well as the limited funds of the Provincial Government to pay for the recurrent costs (refer to the part "Development in the Past and Present Status").

Impact of the new Programmes on the existing Institutes and the Demand for Instructors

Nevertheless, the Provincial Government is willing to stick to the projects and has already ordered the first transfers of instructors from the T.T.C. in Hub Chowki to Sibi and Turbat. At the same time, there is a complete stop in creating any new appointment, resulting in less chance to set instructors free for additional training, as has been common practice in Hub Chowki. The new projects will ask for a high number of posts to be fil-
led, while the T.T.C. Hub Chowki has no vice-principal, none of the three chief instructors, and no apprenticeship officer, let alone, the 17 unfilled posts of instructors and senior instructors in Hub Chowki and the 34 vacant posts at the T.T.C. Quetta.

The total number of grade 14 posts (instructors) and higher grades, either vacant or to be created for the different programmes, in the next years up to 1992, sum up to:

<table>
<thead>
<tr>
<th>Post Type</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nine YVTC (male)</td>
<td>54</td>
</tr>
<tr>
<td>Vacant posts at T.T.C. Quetta</td>
<td>5</td>
</tr>
<tr>
<td>Vacant posts at the T.T.C. Hub Chowki</td>
<td>22</td>
</tr>
<tr>
<td>Two new T.T.C. at Sibi and Turbat</td>
<td>16</td>
</tr>
<tr>
<td>Sec. Vocational Training Project: (PC-I version)</td>
<td></td>
</tr>
<tr>
<td>Institutional Train.</td>
<td>40 (125)</td>
</tr>
<tr>
<td>Implementation Cell</td>
<td>3 (2)</td>
</tr>
<tr>
<td>Industrial Training</td>
<td>10</td>
</tr>
<tr>
<td>Apprenticeship Training</td>
<td>3 (3)</td>
</tr>
<tr>
<td>Additional Trades-Quetta'</td>
<td>29 (29)</td>
</tr>
<tr>
<td>Institutional Train. (female)</td>
<td>21 (14)</td>
</tr>
<tr>
<td>Women's Train. Cell</td>
<td>5 (3)</td>
</tr>
</tbody>
</table>

Posts to be filled of grade 14 and above: 208 (273)

Compared to the present number of 156 staff members (principal to instructor) at the T.T.Cs/ V.T.Cs in the Province of Baluchistan, the high number of posts to be filled will prove to be a serious problem to the development of the institutional training.

To start the institutes under the World Bank grant, as well as the other projects, will prove to be a "killing assumption" for the existing institutes, unless the recommended instructor training is started immediately, and the opening of new institutes is "spaced out" according to the supply of trained instructors, even in the consequence of the projects not being in full operation, as scheduled. The National Staff Training Institute (NSTI), recommended in the World Bank Report, has been initiated in Islamabad after a long political struggle. By Jan. 90, the actual training had not started and only small trial courses for instructors’ up-grading can be expected in the provinces, in the near future. While the recruitment of the staff according to the PC-I is phased from 86/87 to 91/92, the phasing of the training capacity for the NSTI only starts in 92/93. 1)

Another serious problem is the recurrent budget or better to say, its non-availability. All institutes concerned with vocational training in Balochistan, except the sponsored ones, do not operate properly due to lack of consumable materials and spare parts. Seventeen more centres will put more strain on the provincial budget, unless the donors are willing to contribute to the recurrent costs. Unfortunately, this is neither done in the

1) Source: National Vocational Training Project, Phase II, PC-I
Islamabad: NTB-Manpower Division 6/86, p. 37
projects supported by the Fed. Republic of Germany (unofficially the project managers step in, again and again, to keep the training going), nor by the World Bank for the Second Vocational Project. This policy could result in a failure of the projects, and manpower, money, and material might be wasted. Even more dangerous, the vocational training might lose the rest of its small credit, it has in the industries and the general public at present. The low image of vocational training is shown by a newspaper report: "30,000 students deprived of admission to college education in Karachi". Comments in the article demand the start of intermediate classes at major secondary schools and the setting up of new colleges in the city. Technical training towards skilled labour as an alternative education is not even mentioned in the article.2)

2) Source: Sec. Voc. Training Project, Aide Memoire, 1985
3) Source: Dawn of Monday September 11th, 1989 p.5
CHAPTER III

A COMPARATIVE VIEW

OF THE EDUCATIONAL/VOCATIONAL SYSTEMS IN PAKISTAN,

GREAT BRITAIN, AND THE FEDERAL REPUBLIC OF GERMANY

...Three distinct, but related, functions have been ascribed to Comparative Education. The first is that it should contribute to the planned development of education. Its second function has been to contribute to our understanding of principles and practices associated with the provision of education. Finally Comparative Education has been seen as useful in reducing prejudices and in promoting international understanding. 1)

The educational systems of Great Britain and West Germany were selected to be compared with the one of Pakistan, because the British one influenced the Pakistani system significantly, and the West German's system of vocational training has proven to be very effective and much sought after.

...there is an increased interest in the dual system of vocational training by some European neighbours. Training departments of some bigger German companies have become, increasingly, places of "pedagogical tourism".2)

It is not the intention to write a comprehensive, comparative study about the three systems, but mainly to have a look at the vocational training systems, with the aim to find an appropriate solution for the project in Hub Chowki.

1. General Structure in Pakistan 3)

The present system of education has characteristics of the pattern of education introduced by the British Government, in India. Ever since independence, attempts have been made to relate the educational system to the requirements of an independent state. The first milestone in the effort to achieve this desirable relation was the All Pakistan Education Conference 1947, later proceeding to the National Education Policy 1979.

2) Müch J., Lernorte und Lernortkombinationen im internationalen Vergleich, Berlin: European Centre for the Promotion of Vocational Training, 1985, p.21
1.1 The Formal Educational System

The formal educational system has a multistage structure, of which the first is the primary stage which lasts five years and enrols 5-to 9-years-olds. The primary system is followed by a three-year middle stage, a two-year secondary stage and a further two-year higher secondary stage, the so-called intermediate stage. Graduation entitles one to continue studies at college and/or university level.

Universities  Colleges

XII  |Interm.| Polytechnic
XII  |Collegen

XII  Appren-
XII  TTC/ ticeship
XII  VTC Training

X  High School
IX   Middle School

V  Primary
IV
III
II
I

(Diploma)
(Interm. Cert.)
(Skilled Worker)
(Semi-skilled Worker)
(Matric)
(Middle Pass)

Formal Education in Pakistan 1)  Fig. III/1

1.2 The Vocational Training System 2)

The training in the technical field is graded as:

Step I: Certificate Level (skilled and semi-skilled worker)
Step II: Diploma Level (Studies at a polytechnic institute)
Step III: Degree Level (Studies at college/university level)

This description is concerned with steps I and II. The training towards skilled and semi-skilled worker is done by an

informal, on-the-job training as an apprentice, according to the apprenticeship ordinance, or within one of the VTC and TTC, mainly run by the provincial governments. One and two year courses are offered, leading to Grade III and Grade II, respectively, and in addition, short-term courses are offered. Both, the performance of the institutional training programmes is rather poor (refer to Chapter II), and the apprenticeship training did not grow to its expected capacity. In 1984, 350 out of 6000 local enterprises participated with a total output of 4000 apprentices. 1) An informal apprenticeship lasts up to 7 years, while the duration, according to the ordinance, is three years.

The Step II, training towards the diploma, is well established and recognized within the industries. Although approx. 60% of the training is related to practical work, according to the curriculum, due to lack of materials and tools this part is very often neglected. Even though, graduates are employed in the industries and are found to be useful after a period of implant training. They often take positions, which would normally be referred to as skilled workers' positions.

2. General Structure in Great Britain 2)

2.1 The Formal Educational System

Attendance at school is compulsory for children aged between 5 and 16. The publicly financed school system for this age range is organized in two or three tiers: The two-tier system comprises primary schools (age 5-11), sometimes subdivided into infant (5-7) and junior (7-11) school, and selective or nonselective secondary schools (ages 11 to 16 or 18). The three-tier system includes a middle school, and is only to be found in England, where it provides for less than 15% of all pupils.

Since 1965, most local education authorities have been reorganizing their secondary school systems, abolishing the selection test at age 11 (the "11-plus") and introducing nonselective secondary schools (comprehensive schools), catering for all abilities. The great majority of children aged 5-16 are educated in comprehensive schools (refer to Fig. III/2), whereas the Technical School is of very minor importance, because it serves only about 2% of the pupils at this level. This level (age 16) normally ends with the General Certificate of Education (GCE) at (O') level, but education can end at this stage without reaching this O-level. Children over the age of compulsory school attendance (16) may continue at the same school, in what is known as the "sixth form", usually for two further years, when they reach the General Certificate of Education (GCE) at Advanced (A') level, which entitles to continue studies at college/university level.

### Formal Education in Great Britain

| Infant School | 6 |
| Junior School | 7 |
| Technical School | 11 |
| Modern School | 12 |
| Grammar School | 13 |
| Comprehensive School | 15 |
| O' level | 16 |
| A' level | 17 |
| A | 18 |

#### Age

- A, OND, QNC
- Colleges of Further Education (Technical Colleges)

2.2 The Vocational Training System

Those who do not want to go on to the A' level directly, may transfer to a separate institution such as a sixth-form college, tertiary college, college of further education, or technical college. The last three of these are essentially similar, cater for the ages over 16, and offer a wide range of vocational and academic courses, full-time and part-time. The Ordinary National Diploma (OND) and Ordinary National Certificate (QNC), which are equivalent to the A' level, can be reached and entitle for education at college and university level. The apprenticeship training takes place in the factories and technical colleges (dual system) and is controlled by the industries. The training lasts up to five years, the schemes do not provide for a final examination or test or certificate of competence.2) The apprentice who "serves his time" is accepted as craftsman by his em-

1) WEMA-Institut für Empirische Sozialforschung, Informatik und angewandte Kybernetik, Dr. Schmelzer (Publ.), Köln:1974, p. 27
ployer and his trade union. All vocational education schemes related to craft apprenticeship lead to final examinations set at the level of the competent craftsman e.g. "City and Guilds of London Institute" (CGLI). These examinations add to the status of the apprentice, but do not have any bearing on the apprentices' graduation to craftsman status on completion of the appropriate period of time. The apprenticeship training, with approx. 500,000 apprentices, is an important factor within the vocational training. 1)

3. General Structure in Germany 2)

3.1 The General Educational System

The general features of the formal educational system are shown in Fig. III/3. Pre-school or nursery-school facilities are, for most parts, sponsored and run by churches, private welfare agencies, and other private groups. They are capable of handling some 80% of the relevant age group. In general, the primary level consists of the first four grades, which are followed by a two-year orientation stage. The secondary level consists essentially of three types of school. Firstly the "Hauptschule" (similar to the former British secondary-modern school), which has 9, in some cases, 10 grades, and is attended by about 36% of the relevant age group. The majority of its graduates go to part-time vocational schools and apprenticeships. Secondly, the "Realschule", which has 10 grades and is attended by about 26% of the secondary-school age group, offers an academically more demanding curriculum. Its graduates enter apprenticeships or full time vocational schools with the prospect of later continuing in polytechnic colleges. Thirdly, there is the "Gymnasium", predominant-

1) European Communities (Publ.), Die Europäische Gemeinschaft und die Berufsbildung, Luxemburg:1981, p.21
ly academic in orientation. It is attended by about 27% of the lower-secondary-school group, of which some 80% obtain the certificate of graduation entitling them to continue their studies at university-level institutions or polytechnic colleges.

3.2 The Vocational Training System

Special mention must be made of vocational training at the upper-secondary level, which is unusual, especially in comparison with the vocational training offered in other Western countries. The outstanding feature of the so-called dual system of initial vocational training is the comparatively close link between apprenticeships, lasting usually three years and offered by enterprises, and part-time vocational training of a more general and theoretical kind offered by state-run schools. This system, although often charged with being conditioned by economic considerations, has proved to be a quite effective and smoothly working link between general education, on the one hand, and gainful employment, on the other, bridging the partial contradiction between them. In 1984 there were approx. 1.8 million apprentices in Germany, representing 66% of the age cohort 16 - 19. 1)

Organizational Forms of Vocational Training

While elaborating on some different training schemes existing and possible, the vocational training systems of the three above mentioned countries will be viewed and considered.

The actual source of training has been and is the job itself, hence, training takes place at the work place. This training "on the job" is not the result of research and planned education, but simply the answer to the need of preparing the incoming generation of workers for the tasks to be performed at the work place, and by that, to contribute to the production in the firm. Consequently, "inplant training" is oriented towards the direct needs of the companies imparting this kind of training. Workplaces are designed according to economic and productivity needs, and not to the pedagogical needs of the training. What are the advantages and short-comings of the "inplant training"? 2)

Advantages:

- near to the reality of productive work;
- number of training places is regulated according to the demand of production;

2) Karing Peter, How can the Training Capacity of Factories be utilized in the Full? Mannheim: DSE/ZBB, 1986

31
- quality (contents and degree) of training is regulated to the demand of production;

- unbureaucratic and flexible approach towards changes;

- training at the place of demand (decentralized);

- training not only on key trades but on a broad range;

- easy incorporation into the working environment;

- low costs due to training cum production;

- access to training for low income groups.

Short-comings:

- Course of training depends on incoming orders and not on a systematic approach;

- incompleteness of the training in the technical context;

- technological knowledge is not imparted;

- training is limited to purely subject oriented aspects;

- disability of workers to react to changes due to lack of a comprehensive basic training;

- limited mobility of workers due to training on certain tasks and machines only (danger of exploitation).

Training "on the job" must therefore be supplemented with respect to technical progress (technology transfer and development) and social aspects (development of the personality) by means of complementary measures. These complementary measures can be imparted:

- in a factory (training corners, training workshops, factory institutes);

- in an institute, set up by several industries of a certain region or a certain line of products (co-operative workshops/institutes);

- in institutes run by the the government for the trainees within a certain area.

All the three foregoing measures are systems where training takes place in two different locations, the productive place in the factory, and the place for complementary training. This is commonly named the "Dual System of Training". This Dual System can be neglected only in such cases, where simple tasks have to be performed, which can be achieved without theoretical background or advanced technical skills. Training of skilled workers towards
the needs of modern industries, the task of the T.T.C. Hub Chowki, can only follow a "Dual System of Training", regardless, at the moment, what type it could be. "Dual Systems of Training" are introduced in the three countries compared above. While it is of high importance in Great Britain and Germany, it does not function well in Pakistan, and has not been introduced up to now in Balochistan. The reasons for this short-coming have been worked on in different papers,1)2)3) and could also be observed in discussions during the census of the industries in 1987 and later visits:

- Industries do not see the need for a comprehensive training as long as "on-the-job training" is sufficient for a limited task;

- industries are profit oriented and do not want to pay for the training (in Punjab the factories have to contribute to the costs for the supplementary training at the Apprenticeship Training Centres, ATCs);

- industries are not willing to train beyond their immediate demand, since money and effort would be "wasted";

- formal employment in industries falling under the Apprenticeship Ordinance i.e. employing more than 50 employees, is attractive to job seekers, and thus, these industries draw skilled labour from the informal sector;

- industries are reluctant to utilize their expensive equipment and machines for the training with the danger of damage;

- well trained craftsmen might go to other industries and by that be "lost";

- for the Hub Chowki area, skilled workers are available in Karachi without any training efforts.

Gottsleben describes some ways, used by companies, to avoid the participation in the Dual Training Scheme:

- Employers pro forma subdivide one enterprise employing over 50 workers into subenterprises, relatives etc. front as owners;

- employers rename the occupational categories of workers to form groups of not more than 5 working in the same apprenticable trade;

- industries reach exemption from the regulations of the Apprenticeship Ordinance by "persuading" the apprenticeship officer.

1) Thiemann Herbert, Förderung der Berufsausbildung im Punjab in "Die Berufsbildende Schule" 5/1977, p.307
3) Simonsen G., GTZ workshop on the "Dual System" in Madras, 1987
All these facts have to be considered before drawing up a scheme suitable for Hub Chowki. Another approach of defining the "Dual System of Training" has been suggested by Greinert.1) According to him, the "Dual System" is not defined by the two different locations of learning, but by the degree of involvement of the government in the vocational training. Possible degrees are no to be outlined:

Model 1: The government plays no or only a marginal role within the process of vocational training.

This model could be called a market oriented system or in brief "Market Model". Examples of this system we find in Great Britain (refer to Chapter III, p.26), the USA, and Japan. Although the training systems within these three countries differ extremely, they have in common, that the vocational training is neither connected to the formal system of education by vocational schools at the secondary level, nor is there a separate formal training system rendering basic vocational training to the majority of the youngsters. While the systems of general education are well established and a high number of youngsters enter college training, the vocational training is left to the initiative of the individuals, companies, local authorities etc. without almost any governmental rules and regulations. Companies, especially the big ones, play a dominating role within the vocational training. What are the mechanisms, making these "Market Models" function?

- The quantitative offer for vocational training depends on the demand, which is set by the industries;
- the vocational qualification depends on the future placement, planned by the industries according to their needs;
- the industries offer the training in their factories and their own institutes, in order to control the results of the training;
- the industries finance the training, hence, they want to minimize the costs and training, is mostly organized production oriented;
- the industries select the trainees without considering the demands of the society (training for a particular region or province?).

Model 2: The government solely plans, organizes, and controls the vocational training.

This model could be called bureaucratic or according to the places of learning "Institutional Model". Such training systems

1) Greinert W-D., Die Förderung der "dualen" Berufsausbildungsstrukturen in Ländern der Dritten Welt. GTZ workshop on the "Dual System" in Eschborn, 1987
can be found e.g. in France, Italy and many developing countries. This institutional training is generally closely connected to the system of general education, and the entrance qualifications are set by the level reached in the general education. The institutional training provides vocational qualifications of staged levels, and very often additional qualifications at the general level are awarded. What are the mechanisms, making these "Institutional Models" function?

- The quantitative offer for vocational training is set by the planning agencies;

- the qualitative aspect of training is not directly related to possible future placements, but considers demands of the individual and the society;

- planning, organization, and control are under the bureaucracy, training generally is highly systematic;

- training is financed by the public, due to budget constraints it is not offered to a complete age cohort;

- the "Institutional Models" work best when it comes to vocations with a relatively low demand for psychomotor skills e.g. office training.

Model 3: The government includes the industries in the vocational training under conditions, set by the government.

This model could be called a government controlled market system, but due to the involvement of the two partners, the government and the industries, it can be called the "Dual System" of vocational training. Such a system can be found e.g. in Austria, Switzerland, and the Fed. Republic of Germany, countries with a well developed, long tradition of handicrafts and their guilds. The training is not defined to the craft level only, but can also be adopted by the industries as it is done in Germany. The "governmental part" of the training is done in institutes separated from the system of general education, but these institutes award also qualifications equivalent to the general education. The "handicraft/industrial part" of the training is done in the companies under market conditions, but controlled by the government. What are the mechanisms, making these "Dual Systems" function?

- The quantitative offer for vocational training depends on the demand of the companies, but the government can regulate, when necessary;

- the vocational qualification depends on the future placement in the companies, but the government is involved in setting the objectives;

- the companies organize the training, but according to govern-
mental rule, regulations, and under direct or indirect supervision;

- the industries finance the training, but the government is often responsible for the institutional part;

- through the governmental influence, the systematic approach towards training can be controlled.

Viewing the three models, one could get the wrong impression, that the "Dual Model" was created to combine all the advantages and to avoid the disadvantages of the other two systems. Actually, the "Dual System" developed in a historical process, while the other systems proved their success definitely in the process of industrialization in certain countries. There is no vocational training systems which guarantees optimal results under all possible socio-economic conditions. Even though, the "Dual System" has advantages which makes it attractive for industrialized and developing countries:

- Limited expenses for the public funds;

- a training closely related to practical work;

- quantitative and qualitative aspects of training according to demand and social needs;

- limited bureaucracy;

- a relatively big fraction of an age cohort can receive a training;

- if successful, the drive towards higher education and "white-collar-jobs" can be limited.

Where does Pakistan fit into these systems?

The existing and planned T.T.C.s and V.T.C.s together with the polytechnics show a picture of Model 2, the "Institutional Model", where the government provides training to a limited number of trainees without participation of the industries. Curricula are set by a government institution (National Training Board), in the committees the industries are represented to a limited degree, only.

The informal sector of training shows clearly a picture of Model 1, the "Market Model", where industry and bazars train only limited skills to a number of trainees directly in demand for a certain workplace. Systematic skill training and theoretical training is not imparted. In some bigger companies the beginning of a systematic approach can be seen and trainees are accepted under the apprenticeship ordinance, but still this falls under the "Market System", because the control, by the government, is very limited.
Already, in 1973, a "Dual System" (Model 3) was introduced in the Punjab. Practical Training was done in the industries, while the basic training and the theoretical part was done in the ATCs, the Apprenticeship Training Centres. Although this model had a good start, the result has not been as expected (refer to p.33). Presently there is an ongoing project to revive and expand this system in the Punjab again, and a close observation of the development will be of interest for the project in Hub Chowki.

A Proposed Training Scheme for the Hub Chowki Area

Proposing a scheme for the Hub Chowki Area, the writer makes the following assumptions, based on the foregoing facts and ideas.

- In countries without industrial tradition, the companies are not in the position to offer vocational training right away;

- without a tradition of industrial training, a basic training is needed before the start of production oriented training;

- aspects of maintenance can only be properly taught "on-the-job";

- work in modern industries demands for theoretical trade knowledge;

- the provincial government wants to enforce social aspects into the training scheme;

- the provincial government has limited funds only.

- for the time being, companies in the area have no intention of investing much into training, because the factories were set up out of taxation reasons and the headquarters and administrations are in Karachi.

These assumptions lead to following conclusions:

- A basic training has to be provided;

- theoretical classes have to be offered;

- industries have to be involved for the "on-the-job training";

- the provincial government has to be involved to control the social demands.

Result:

A one year institutional training is proposed leading to Trade Test Grade III, organized by the government, followed by a
phase of "Dual Training" leading to Trade Test Grade II. This
"Dual Training" should be organized as an institutional training
for theory and special skills, and as an industrial training for
the skills required for production related work. The duration of
the industrial part should be left to the development, and may be
increased as the industries are more and more in the position to
provide systematic training. Since the maintenance work (main-
tenance mechanic and maintenance electrician are offered trades),
and production work (machinist is an offered trade) cannot be
trained beyond the basic level at reasonable costs, the project
should, under no circumstances, try to train towards Trade Test
Grade II at institutional level, without the involvement of the
local industries.

... Even if structures of a "Dual System of Training"
cannot be introduced to a certain country immediately,
one has to proceed in stages, without giving up the aim
of a "Dual System of Training". 1)

1) Greinert W-D., Die Förderung der "dualen" Berufsausbildungs-
strukturen in Ländern der Dritten Welt. GTZ workshop on the
"Dual System" in Eschborn, 1987 p.13
CHAPTER IV

A CENSUS

COVERING THE INDUSTRIES OF THE HUB CHOWKI

INDUSTRIAL TRADING ESTATE AND OTHER NEAR-BY INDUSTRIES

Before the initial start of classes, scheduled according to the plan of operation for April 1987, a census of the industries was conducted from January 7th to January 28th 1987 in collaboration with the Department of Labour and Manpower, Quetta.

This census draws its justification out of the following, important reasons:

- The statistical contents of the appraisal study needed up-dating because of the long lapse of time.

- The newly established T.T.C. with its concept and services needed to be advertised.

- The possibly changed demands of the industries had to be re-evaluated.

To make sure, that during this semi-official inquiry the investigator (writer) would be received at the necessary level of management in the companies, the Directorate Labour - Manpower in Quetta assigned the Dy. Director - Manpower Training as a co-investigator. This step proved to be very valuable, because it opened almost every door and made the industries very co-operative.

Expected Results of the Census

01. Necessary data about the industries will be collected.

02. The newly established Pak-German T.T.C. Hub Chowki will be introduced to the managements of the industries in this area.

03. The concept of the training scheme will be known to the managements of the industries.

04. The level of acceptance of the Pak-German T.T.C. by the industries will be stated.

05. The level of acceptance of the apprenticeship scheme by the industries will be stated.
06. The existing training activities within the industries will be stated.

07. Recommended skills for the training at the T.T.C. will be stated.

08. Recommended new trades for the T.T.C. will be stated.

09. The pace of development at H.I.T.E. will be compared to the status of Nov. 1981.

10. The intended programme of the T.T.C. will be adjusted to the actual requirements of the industries.

Method of the Census

In order to achieve the results, it was decided to conduct a complete census of the industries located in the area. A taking of samples would not have been sufficient to establish the close relations between the T.T.C. and the industries, necessary for the future implementation of the apprenticeship scheme. This census was done by inquiry through investigators, rather than by mailcards, because an apprenticeship scheme operated simultaneously with an institutional training, needs a detailed personal explanation by the questioners. To establish a close contact with the industries, the writer visited all the industries, personally, instead of getting help of several investigators.

The following sequence of steps was utilized:

01. The investigator team (Dy. Director Manpower-Training and the writer) met the general manager and/or the plant manager of the company.

02. The newly established T.T.C. and its programme were introduced and explained.
   (Material used: Information leaflet, announcement poster, refer to Appendix IV/2, IV/4, IV/5)

03. The questionnaire was explained.
   (refer to Appendix IV/3)

04. The company was invited to nominate a first-year trainee and sponsor him. At the same time the request was made to fix the announcement poster to the notice board of the factory.

05. The questionnaire was filled in (this only succeeded in rare cases).

06. Arrangements were made for the collection of the questionnaires.
07. The questionnaires was collected personally.
   (A very time-consuming, but fruitful method, as detailed questions arose at the time of collection and steps O1, O2 and O3 were repeated.)

Results Accomplished

Result O1: Necessary data about the industries were collected.

Result O2: The newly established P.G.T.T.C. was introduced to the managements of the industries in this area.

Result O3: The concept of the training scheme is now known to the managements of the industries.

<table>
<thead>
<tr>
<th>Companies visited</th>
<th>86</th>
<th>100 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Companies closed at present</td>
<td>1</td>
<td>1.2 %</td>
</tr>
<tr>
<td>Companies refusing to fill in the questionnaire</td>
<td>1</td>
<td>1.2 %</td>
</tr>
<tr>
<td>Nos. of questionnaires which could not be recovered</td>
<td>4</td>
<td>4.7 %</td>
</tr>
<tr>
<td>(Results O2, O3 can be considered as fully reached, while O1 is partly reached)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nos. of questionnaires filled in and collected</td>
<td>80</td>
<td>92.9 %</td>
</tr>
</tbody>
</table>

Nos. of Companies covered in the Census

Table IV/1

The remaining 4 questionnaires could not be recovered despite the support of the Department of Labour and Manpower. Since at least the visit and the explanation of the programme have been accomplished, it can be assumed that a major part of the Results O1, O2, O3 is complete, even though these companies are not interested in a co-operation in the field of the vocational training.

The collected data are stored in a card-index for further use, and a computer programme is written for quick reference and up-to-date adjustments.
Result 04: The level of acceptance of the Pak-German T.T.C. by the industries is stated.

The acceptance can be measured

a) by the number of sponsored trainees during the first year,
b) by the number of apprentices taken after the first year,
c) as well as by the rate of employment after their training as skilled workers.

Measurement a) proved to be invalid, because the trainees did not disclose their sponsorship by a certain company, despite a signed statement. This inhibition may be due to their desire to collect the stipend (200.-Rs) from the Government of Balochistan in addition to their support from the factories.

Figures for measurement b) can be found in Tables VI/1 and VI/2.

Measurement c) can only be used as means of verification after the first batch will have completed its training and is ready for employment.

Result 05: The level of acceptance of the apprenticeship scheme by the industries is stated.

During the discussions with the responsible persons in the industries, it turned out that they very much favour the apprenticeship scheme (2nd and 3rd year in the industry) against a 2nd year of full-time institutional training.

| Nos. of questionnaires filled in and collected | 80 | 100 % |
| Nos. of companies willing to take trainees | 58 | 72.5 % |
| Nos. of companies not yet sure | 5 | 6.3 % |
| Nos. of companies unwilling to co-operate in the training | 2 | 2.5 % |
| Nos. of companies not able to take trainees due to lack of adequate training places and/or personnel to guide the trainees | 15 | 18.7 % |

Nos. of Apprentices initially wanted Table IV/2
The break-up of the initially wanted apprentices to the trades is as follows:

<table>
<thead>
<tr>
<th>Trade</th>
<th>No.</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Millwright Fitter</td>
<td>23</td>
<td>11.7%</td>
</tr>
<tr>
<td>Maintenance Mechanic</td>
<td>65</td>
<td>33.2%</td>
</tr>
<tr>
<td>Machinist</td>
<td>48</td>
<td>24.5%</td>
</tr>
<tr>
<td>Maintenance Electrician</td>
<td>60</td>
<td>30.6%</td>
</tr>
<tr>
<td>Total</td>
<td>196</td>
<td>100%</td>
</tr>
</tbody>
</table>

Break-up to the Trades

Table IV/3

A further verification of this result can be concluded from the results of the field survey 88, conducted as a preparation for the placement of the first batch of apprentices (refer to Chapter V).

Result 06: The existing training activities within the industries are stated.

It can clearly be stated that not even a single factory offers organized training. All the skilled workers are recruited from Karachi and machine operators are trained on the job for one machine only.

The managements are not satisfied with this situation, especially after the disturbances in Karachi, which caused several total production interruptions. Therefore, the initiative of the Government of Baluchistan in setting up the T.T.C., is highly appreciated.

Result 07: Recommended skills for the training in the T.T.C. are stated.

While several companies had no special advice to give due to their uncomplicated machines and processes, others named skills to be included in the training of the P.G.T.T.C.. A distinction was mainly made between the electrical and mechanical trades, and the skills mentioned are mostly not taught in any T.T.C. in Pakistan up to now. They were not named to compete with the diploma courses or engineering courses, but as a preparation of the skilled workers for the modern and changing industries.
Mechanical Trades

<table>
<thead>
<tr>
<th>Skill / Knowledge</th>
<th>Nos. of Mentions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hydraulic and Pneumatic</td>
<td>24</td>
</tr>
<tr>
<td>2. Special Welding Methods</td>
<td>8</td>
</tr>
<tr>
<td>3. Heat Treatment</td>
<td>3</td>
</tr>
<tr>
<td>4. Precision Measurement Methods</td>
<td>7</td>
</tr>
<tr>
<td>5. Knowledge about Materials</td>
<td>4</td>
</tr>
<tr>
<td>6. Drafting</td>
<td>5</td>
</tr>
</tbody>
</table>

Special Skills for the Mechanical Trades

The mentioned skills can be divided into two groups:

a) No. 4, 5, 6 are standard parts of a modern training and are therefore already incorporated in the P.G.T.T.C. programme.

b) No. 1, 2, 3 are not yet standard in Pakistan, but have been included in the training programme for the case of the Pak-German T.T.C.

Hydraulic and pneumatic will be taught, regardless of an institutional- or apprenticeship training, and six places for lab. training are available.

Heat treatment will not be taught together with forging only, but in a separate unit with two different heat treatment furnaces.

Thirdly, there are four places for MIG / MAG welding available.

Electrical Trades

For the electrical trade again, there is a group of skills/knowledge (No. 2, 3, 4), which are already part of the programme. To train these skills/knowledge, a complete electrical lab. is installed and lab. exercises are part of the weekly schedule.

Motor winding (skill/knowledge No.5) is not included in the training, because it is considered as a separate trade and not as a skill for maintenance electricians.
Industrial electronics (skill/knowledge No.1), though having been in discussion, was not included in the programme. As it turned out to have the highest number of mentions, this subject will be part of the institutional- and apprenticeship training.

<table>
<thead>
<tr>
<th>Skills / Knowledge</th>
<th>Nos. of Mentions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Industrial Electronics</td>
<td>25</td>
</tr>
<tr>
<td>2. Contactor Circuits</td>
<td>8</td>
</tr>
<tr>
<td>3. Measurement / Instrumentation</td>
<td>12</td>
</tr>
<tr>
<td>4. Diagram Reading</td>
<td>8</td>
</tr>
<tr>
<td>5. Motor Winding</td>
<td>1</td>
</tr>
</tbody>
</table>

Special Skills for the Electrical Trade  
Table IV/5

Result 08: Recommended new trades for the T.T.C. are stated.

Again, several companies had no special advice to give, but the rest focused mainly on 5 trades. The one with the highest mentions, the power generation mechanic, is a certain requirement of the area, because most of the industries at H.I.T.E. depend on diesel-generator-units for emergency or sole supply. Therefore, reliable operators with good technical background are needed. Tool and die making, as well as welding as a separate trade, have to be considered when the expansion under the second phase will be discussed.

<table>
<thead>
<tr>
<th>Trade</th>
<th>Nos. of Mentions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Boiler Attendant</td>
<td>6</td>
</tr>
<tr>
<td>2. Power Generation Mechanic</td>
<td>17</td>
</tr>
<tr>
<td>3. Skilled Worker for Chemical Industries</td>
<td>9</td>
</tr>
<tr>
<td>4. Tool and Die making</td>
<td>11</td>
</tr>
<tr>
<td>5. Welding</td>
<td>9</td>
</tr>
<tr>
<td>6. Plumbing</td>
<td>1</td>
</tr>
<tr>
<td>7. Industrial Electronics</td>
<td>2</td>
</tr>
<tr>
<td>8. Automotive</td>
<td>3</td>
</tr>
</tbody>
</table>
Required additional Trades

<table>
<thead>
<tr>
<th>Trade</th>
<th>Nos. of Mentions</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. Casting</td>
<td>1</td>
</tr>
<tr>
<td>10. Refrigeration</td>
<td>3</td>
</tr>
<tr>
<td>11. Spinning</td>
<td>1</td>
</tr>
<tr>
<td>12. Woodworking</td>
<td>3</td>
</tr>
</tbody>
</table>

Table IV/6

07. Result 09: The pace of development of the local industries at Hub Chowki is compared to the status of Nov. 1981.

The census shows clearly, that the pace of development with regard to the number of companies at Hub has been much slower than planned by the Government of Baluchistan and as assumed in the Appraisal Study of 1982 (page 27). According to the writer's personal observation since the completion of the census, the construction activities, the abandoned buildings, and the closed factories do not imply a much faster pace during the next few years.

With regard to the number of factories, the progress is much slower than assumed in the planning:

![Graph showing actual and projected development of companies at Hub from 1981 to 1990](image)

Nos. of Companies at Hub, projected/actual Figure IV/1
With regard to the number of employees, appraisal study and reality are contradicting each other:

<table>
<thead>
<tr>
<th>Workers (X 1000)</th>
<th>projected development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workers (X 1000)</td>
<td>actual 7.9 development</td>
</tr>
<tr>
<td>1981 82 83 84 85 86 87 88 89 90</td>
<td></td>
</tr>
</tbody>
</table>

Nos. of Workers, projected/actual Figure IV/2

In Nov. 1981, 20 factories, with approx. 2000 employees, were operated at the Hub area, comprising of an average of 100 employees per factory. For 1990, 800 factories are planned with approx. 21,000 employees, resulting to an average of 26 employees per factory. The census shows, that the average number of employees per factory has hardly changed: 86 factories with 7900 employees, hence, an average of 92 employees. If this tendency went on, the planned 800 factories would result to approx. 74,000 employees, instead of the projected 21,000, a number, even on longer terms far beyond the infrastructure of this area. These contradictions had been partly foreseen by the appraisal group (..., the assumed average number of employees per factory seems rather low ..., page 46). As a result, the projected number of factories as well as the number of employees, seem to be guesswork and require a new study. A too optimistic view, and insufficient research and statistical material are the reason. On request, the Department of Labour and Manpower still provides the old figures as the present status, not wanting to be/being aware of abandoned buildings and non-operative factories.

For monitoring reason, a follow-up survey is to be conducted after two years (Jan./Febr. 89), gaining information on the actual development of the area. The adjusted figures can be used for the evaluation of the project, planned for April 1989.
Result 10: The intended programme of the P.G.T.T.C. is adjusted to the actual requirements of the industries.

1. According to Table IV/3 the millwright fitters take only 11.7% of the wanted trainees, while they take 30% of the seats in the planned P.G.T.T.C. programme. Since the interest of the applicants in this trade, according to the applications, is 3.5%, there is the necessity to abolish this trade and change the ratio of the capacities for the other three trades. This will cause no problem, because during the first half year the basic training is similar for the mechanical trades. For the second half year the plans for the utilization of workshops and machinery have to be changed, and since the ratio of seats in the trades, as well the the number of trades, are part of the plan of operation, the Government of Balochistan has to agree to this change (refer to App. IV/6).

2. The appraisal study assumed the ratio:

1/3 of the trainees to drop out after the first year,
1/3 of the trainees to continue in the institutional training,
1/3 of the trainees to start an apprenticeship training.

This break-up does not correlate with the actual situation:

a) The industries apparently show a great interest in the apprenticeship scheme for the second and third year.

b) In the field survey 88 this trend is stabilized.

c) The trainees opt for the training in the industries.

d) The Government of Balochistan faces difficulties in shouldering the recurrent expenses for the training.

Therefore the P.G.T.T.C. will try to introduce the apprenticeship scheme at a scale higher than the ratio assumed in the appraisal study.

3. The requirement of the industries for new skills in the mechanical field (Table IV/4) will be met by the existing programme and equipment. Except for the industrial electronics this also applies to the electrical trade (Table IV/5). This subject will be included in the curriculum for the Level II (skilled worker) as two 2-week units (refer to the "course outlines" in Chapter VII). These units can also be used within the short-term courses and evening classes.

4. The pace of development of the P.G.T.T.C. has to be adjusted to the development of the industrial estate, while the training capacity has to be devoted to instructor training, curriculum development, initiation of the apprenticeship scheme and to short-term courses for the workers from the industries.
Monitoring Survey 1989

In order to monitor the trend of development, derived from the results of the census conducted in 1987, it was found necessary to conduct a short "monitoring survey". As a suitable timing January 89 was considered for the following reasons:

1. A period of two years had elapsed.


3. An evaluation of the project had been scheduled for April 89.

Expected Results of the Survey

1. The number and fields of production of the factories closed since the census will be stated.

2. The number and fields of production of newly established factories will be stated.

3. The changes of taxation, applicable at H.I.T.E., will be stated.

Method of Survey

In order to minimize expenses and effort, it was decided to utilize an investigator team of the Department of Labour and Manpower, at that time present in Hub Chowki for a different survey. The results were cross-checked with the existing data and verified by personal telephone calls to 50% of the new factories, selected at random.

Results Accomplished

Result 1:

<table>
<thead>
<tr>
<th>Field of Production</th>
<th>Nos. of Factories closed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical</td>
<td>5</td>
</tr>
<tr>
<td>Food</td>
<td>1</td>
</tr>
<tr>
<td>Construction</td>
<td>1</td>
</tr>
<tr>
<td>Casting</td>
<td>1</td>
</tr>
<tr>
<td>Packing Industries</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9</strong></td>
</tr>
</tbody>
</table>

Closed Factories
Table IV/7
Result 2:

<table>
<thead>
<tr>
<th>Field of Production</th>
<th>Nos. of newly established Factories</th>
<th>Nos. of new Factories, closed again</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Food</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Mechanical Production</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Textile/Yarn</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>16</td>
<td>3</td>
</tr>
</tbody>
</table>

Newly established Factories at Hub

Table IV/B

This brings the total number of factories operating at Hub Area to

90 Units

Inserting this number into Figure IV/1 it shows in Figure IV/3, that the even the slower pace of development, predicted in 1987, could not be materialized.

Companies

![Graph showing projected and actual development of companies at Hub, revised over years 1981 to 1990.](image-url)
In an interview with the Managing Director of the Las Bela Industrial Estate Development Authority (L.I.E.D.A.) the following facts were stated:

1. On June 30th 88, the five years tax holiday for newly established factories had been abolished, leaving this privilege to the already existing ones. This was a country wide decision, to give the tax holidays only to new factories in less developed areas.

2. On July 1st, 88 a five years tax holiday was introduced for new factories, using raw materials of Pakistani origin (70%). Since this is country wide, too, the attraction of the area at Hub Chowki lies within its infrastructure and the vicinity of Karachi and its facilities, and not in the taxation system.

3. Existing factories at H.I.T.E. can only remove the installed machinery and shift to a new area, when they have paid all the taxes they were supposed to pay without tax holiday.
CHAPTER V

FIELD SURVEY,
COVERING 24 SELECTED COMPANIES
IN THE HUB AREA

Before the end of the first year of training, scheduled for June 1988, it was necessary to approach a selected number of companies in the Hub area to find the actual demand for apprentices for the initial start of the industrial training. The field survey was conducted from Febr. 15th to Febr. 18th 1988.

The selection was done under the following considerations:

1. The companies should have shown a good interest in the training scheme during the census in 1987 (refer to Chapter IV).

2. The total number of employees should exceed 50, because such companies are required to conduct apprenticeship training according to the Apprenticeship Ordinance of 1962.

3. The state of production facilities and equipment should be sufficient for an industrial training in one or more of the three trades.

Selection of Companies for the Survey:

| Companies willing to co-operate in the scheme according to the census 87 | 58 |
| Factories closed in the meantime | 5 |
| Newly established factories | 4 |
| **Total** | **57** |
| Companies temporary closed or not yet in production | 6 |
| Companies not suitable for the scheme due to limited capacities and variety of work | 21 |
| Companies suitable to a certain extent, but not for the initial phase | 6 |
| **Companies selected** | **24** |

Selection of Companies Table V/1
Expected Results of the Survey

01. Changes in the responsible staff (persons to be contacted) will be shown.

02. The willingness to participate in the training scheme will be verified.

03. The number of trainees wanted under the actual conditions will be stated.

04. A generally accepted date for the start of the training will be fixed.

05. The preferred release system will be known.

06. The production facilities and equipment are viewed again.

Method of the Survey

In order to reach the results, it was decided to conduct this survey by inquiry through investigators. This was done, because the personal visit provides a chance for further explanation, e.g. the release system, and for a personal "inspection" of the production machines and equipment.

The following sequence of steps was utilized:

01. The investigator team met the personnel manager and the plant manager of the company.

02. The progress of the training at the Pak-German T.T.C. was explained.

03. The organization of the apprenticeship training was explained.

04. The questionnaire was explained (refer to Appendix V/1 and V/2).

05. The questionnaire was filled in. (Different from the census in 1987, companies were willing to provide the answers immediately.

06. A "tour" through the factory was made, observing the processes and machinery. This was an opportunity to meet the engineers and foremen.
Results Accomplished

Result 01: Changes in the responsible staff were noted and have been filed.

Result 02: The willingness to co-operate in the scheme has been emphasized by the managements.

Result 03: The number of trainees wanted for the first intake is stated (refer to Table V/4).

Result 04: July 1st, 88 was selected as the common date to start the training, but concession was made for one company demanding June 1st, because of a production need.

| Companies in favour of June 1st | 1 |
| Companies in favour of July 1st | 21 |
| Companies in favour of Aug. 1st | 1 |
| **Total** | **24** |

Start of Classes Table V/2

Result 05: The two-week block has been selected as the system for the up-grading and theory classes.

| Companies in favour of the day release | 4 |
| Companies in favour of the 2-week block | 10 |
| Companies in favour of longer blocks | 2 |
| Companies indifferent to the subject | 8 |
| **Total** | **24** |

Release System Table V/3

Result 06: As a result of the "observation tour", three factories were placed to the category "suitable to a certain extent, but not for the initial phase". Furthermore, three companies showed so much resistance despite the stated demand, that the persuasive phase will certainly take another year, which brings the total number of suitable companies down to 18 with a demand of:

18 Maintenance Electricians
26 Maintenance Mechanics
13 Machinists.
<table>
<thead>
<tr>
<th>Name of Company</th>
<th>Nos. of required Trainees</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>01. Agriauto</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>02. Baluchistan Engineering</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>03. Latif Jute Mills</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>04. Allied Tractors Ltd.</td>
<td>--</td>
<td>2</td>
</tr>
<tr>
<td>05. Baluchistan Wheels Ltd.</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>06. Pak. Telephone Cables</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>07. Pioneer Cables Ltd.</td>
<td>--</td>
<td>2</td>
</tr>
<tr>
<td>08. Siddiqsons Tex. Ltd.</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>09. Pak. Fibre Ind. Ltd.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>10. Feroze Tex. Mills Ltd.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>11. N.P. Waterproof Textile</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>12. N.N. Textile Mills Ltd.</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>13. Baluchistan Glass Ltd.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>14. Attock Cement Pakistan</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>15. Polyron Ltd.</td>
<td>--</td>
<td>2</td>
</tr>
<tr>
<td>16. Gatron Industries Ltd.</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>17. National Fructose Comp.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>18. Bela Engineers Ltd.</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>19. Bolan Casting Ltd.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>20. Mian Nazir Sons Ltd.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>21. Auditronics Ltd.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>22. Filtronia Pakistan Ltd.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>23. Balu. Particle Board</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>24. Habib Arkady Ltd.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>23</td>
<td>34</td>
</tr>
</tbody>
</table>

Training Places available

Table V/4

55
Summary and Recommendation

Appraising the results, it is recommended to place all trainees of the first intake as apprentices in the industries starting July 88. The industries can absorb all the trainees, but this is not certain for the future, when the institute might be running on full capacity.

<table>
<thead>
<tr>
<th></th>
<th>Trades</th>
<th>ME</th>
<th>MM</th>
<th>MA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offered places in the industries</td>
<td>18</td>
<td>26</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Trainees ready for placement</td>
<td>14</td>
<td>9</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

Training Places needed

Table V/5

The institutional training during the apprenticeship should have a duration of two weeks followed by approx. two month work in the industries.

As a next step, a list of trainees should be prepared and presented to the industries together with an invitation for an interview of the trainees at the Pak-German T.T.C. After this final placement, a short seminar should be arranged to brief all parties concerned, ensuring a smooth start of the training. The necessity of regular visits to the industries after the start is understood.

A Comparison between the Census 87 and the Survey 88

Comparing the census in 1987 and the survey in 1988 is not a real comparison of facts and figures, but of atmosphere and personal response. During the census 87, the authority of the Dy. Director Labour-Manpower was needed, even to enter the factories and to meet the managers. Despite of their friendly promises to co-operate, it took a long time to recover the properly filled in questionnaires. New excuses were found, again and again, to avoid answering the questions.

Between the census and the survey, the Pak-German T.T.C. had started to operate and had become slowly known to the industries. As a result, the survey 88 was much easier to conduct and all questionnaires were filled in right during the interviews. There was a keen interest in details of planning and operation with frequent requests for the curricula.

One authentic statement from one of the factory managers can indicate the atmosphere: "...I must admit, that I threw away all the leaflets and posters of the census, because so much talking had been done about a T.T.C. at Hub Chowki - without result ..."
CHAPTER VI

INITIATION AND PROMOTION OF THE TECHNICAL TRAINING SCHEME

The objectives of the P.G.T.T.C. are two-fold:

1. Starting an industry oriented training for Balochistanis towards semi-skilled and skilled workers, and

2. initiating an apprenticeship scheme for the first time in Balochistan.

Selecting H.I.T.E. and other industries of Hub area for initiating an apprenticeship scheme and commencing an industry oriented training, has its pros and cons. On the one hand, it is a favourable location due to a good number of suitable industries already existing with a demand for a high number of skilled Balochistani workers (refer to Chapter IV), on the other hand, Hub Chowki only has a small population with absolutely no potential to fill the training places with suitable candidates.

Promotion, therefore, had to start in two main directions:

1. Recruiting suitable trainees from the near-by districts in the province, and

2. introducing the institute as well as the training scheme to the industries.

1.1 Recruitment and Selection of the First Intake, July 1987

The following steps were undertaken to reach the goal, the start of the training with 80 suitable trainees on April 5th, 1987. (Number of trainees and date of start according to the plan of operation)

1. During the census of the industries at Hub Chowki, the Pak-German T.T.C. was introduced to the local companies and posters were fixed to the notice boards of the factories.

2. Posters were fixed to the notice boards of the town halls and other official buildings in Hub Chowki, Gadani, Uthal, and Bela (District of Las Bela).

3. High schools were visited and the programme explained to the headmasters of the schools in Hub Chowki, Gadani, Uthal, and Bela.

4. Trade union representatives of the Gadani ship breaking indus-
tries were informed.

5. Announcements appeared in Balochistani as well as Karachi newspapers.

6. Announcements were transmitted via TV on one evening.

7. Application forms were made available at the following offices:
   
   P.G.T.T.C. Hub Chowki
   Labour Office, Hub Chowki
   Assistant Commissioner, Hub Chowki

   The deadline for submitting the forms to any of the three offices was Febr. 25th, 1987. On that date, 203 applications had been received. On the day of the test, March 2nd 1987, 177 applicants arrived for the entrance test.

   Before the start of the test, Balochistani applicants formed a group refusing to take the test unless those from Sindh and Karachi were expelled from the test. Only after discussions with the Assistant Commissioner of Hub Chowki, could the group be persuaded to sit for the test. (The set-up of the test, the evaluation and the results are covered in the unpublished dissertation of H.G. Beck, Karachi University)

   This incident has shown, clearly, that the political situation in Balochistan has not been taken into consideration as much as it should have been. During the initial preparation of the project, the partners agreed on Balochistani applicants having top priority, while leaving the rest of the places to applicants from outside the province. It turned out, however, that the provincial government was not willing to accept any other trainees than Balochistanis.

   This political trend affects the project, seriously, and has to be taken into account. While for e.g. the Province of Punjab has already a tradition of more than 20 years of technical training, Balochistan is only at the beginning of its industrial development. It is understandable that the authorities try to keep, for their own population, what is offered to them. On the other hand, trainees do not face competition and are sure, and even made sure by the political leaders, that the training places in the T.T.C., the training places in the industries and subsequently, the working places are a given privilege, which one gets without hard work and perseverance. Threats and physical force used against instructors and the principal are the result in the T.T.C., and collection of "Goonda Tax" (forcible collection) and highjacking of busses and cars in the industries. It has to be clarified to the trainees, that the privileges must be earned, and the principal has to be backed by the provincial authorities.

   As a result, the approval of the successful candidates took so long, that classes could not start on time. As a new date, July 26th 1987 was chosen, and the training started on that day.
with a total of 54, all of them proven locals of Balochistan. The number of 54 decreased within a very short time, leaving only 46 candidates to be considered as real trainees. Reasons for the quick decrease could not be found, because the would-be trainees only came for a few days and left without announcement and explanation. Even the remaining number has shown a constant decrease over the time, making this phenomena a matter that has to be taken into serious consideration for further planning (refer to Table VI/1).

<table>
<thead>
<tr>
<th></th>
<th>Mainten.</th>
<th>Mainten.</th>
<th>Electr.</th>
<th>Mechanic</th>
<th>Machinist</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>24</td>
<td>40</td>
<td>16</td>
<td>80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Admission (July 1987)</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intake (realistic status)</td>
<td>18</td>
<td>12</td>
<td>16</td>
<td>46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Status at start of 2nd term</td>
<td>16</td>
<td>10</td>
<td>12</td>
<td>38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade Test III taken (1988)</td>
<td>14</td>
<td>9</td>
<td>11</td>
<td>34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade Test III passed</td>
<td>13</td>
<td>8</td>
<td>10</td>
<td>31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ready for an apprenticeship</td>
<td>12</td>
<td>8</td>
<td>8</td>
<td>28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Placed in the industries</td>
<td>12</td>
<td>8</td>
<td>8</td>
<td>28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Status at:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st up-grading (01/13-10-88)</td>
<td>10(10)</td>
<td>7(6)</td>
<td>6(6)</td>
<td>23(22)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd up-grading (03/15-12-88)</td>
<td>9(8)</td>
<td>6(5)</td>
<td>6(5)</td>
<td>21(18)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd up-grading (04/16-02-89)</td>
<td>9(6)</td>
<td>7(4)</td>
<td>4(4)</td>
<td>20(14)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4th up-grading (01/13-04-89)</td>
<td>7(5)</td>
<td>8(4)</td>
<td>4(4)</td>
<td>19(13)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5th, 6th, 7th, 8th up-grading</td>
<td>(Oct./Nov.89)</td>
<td>8(1)</td>
<td>5(2)</td>
<td>4(4)</td>
<td>17(7)</td>
<td></td>
</tr>
<tr>
<td>Trade Test II taken (Nov.89)</td>
<td>7</td>
<td>5</td>
<td>4</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade Test II passed</td>
<td>7</td>
<td>3</td>
<td>3</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed in the trade</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Intake and Follow-up, Batch 87

Table VI/1

Numbers in ( ) state the numbers of trainees, who are still in
the industries as apprentices, while the higher numbers show the participants in the up-grading courses.

One of the reasons for the rapid drop-out, at the very beginning, might have been a misunderstanding about the aim of the institute. Again and again, it required explanation to trainees and managers of the industries that the institute does not lead to a diploma or even to a degree in engineering. Since about 82% of the trainees had matric at the start, they might have gone to other institutes offering diploma courses. The number of graduates from intermediate classes are not known, because those were officially not accepted and applicants might not have disclosed this fact, to avoid rejection. This desire for further technical training could be utilized by offering courses after completion of the Trade Test Grade II, making the craftsman training more attractive to matriculates. Besides that, more emphasis should be given to the group with middle pass.

1.2 Recruitment and Selection of the Second Intake, August 1988

The preparations for the second intake, planned for January 10th 1988, proceeded similar to the first intake, except for the following changes:

1. Advertisements were neither done through the Karachi newspapers, nor through the TV, in order to avoid applications from Karachi.

2. Posters and application forms clearly stated the exclusive right of admissions for Balochistanis only.

3. The requirement was extended to including a local certificate apart from the application papers.

4. With the help of trainees and their relatives, posters and application forms were distributed to farther places, such as Turbat, Pasni, Gwadar, Khuzdar etc.

The preparations were disrupted by an order from the Provincial Government, in Quetta, to postpone the entrance test, scheduled for Nov. 2nd 87, and to conduct it on Nov. 23rd under the supervision of a committee. The test was held on the day planned without a committee showing up. The results were submitted to the Directorate Labour Manpower, Quetta, for approval and announcement. (Set-up of the test, the evaluation and the results are covered in the unpublished dissertation of H.G. Beck, Karachi University)

The approval, including the screening of every single applicant by a committee of Assistant Commissioners from the districts concerned, took up to March 1988. The start of classes had to be postponed to August 1988. To ensure the utilization of the full
capacity, advertisement and tests were continued between March and August 1988, resulting in an admission beyond the capacity desirable, taking the quick drop-out of the Batch 87 into account. (Refer to Table VI/2)

<table>
<thead>
<tr>
<th></th>
<th>Mainten.</th>
<th>Mainten.</th>
<th>Electr.</th>
<th>Mechanic</th>
<th>Machinist</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>24</td>
<td>40</td>
<td>16</td>
<td>80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Admission (August 1988)</td>
<td>26</td>
<td>46</td>
<td>18</td>
<td>90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intake (realistic status)</td>
<td>21</td>
<td>34</td>
<td>14</td>
<td>69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Status at start of 2nd term</td>
<td>19</td>
<td>29</td>
<td>11</td>
<td>59</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade Test III taken (1989)</td>
<td>19</td>
<td>28</td>
<td>11</td>
<td>58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade Test III passed</td>
<td>18</td>
<td>23</td>
<td>11</td>
<td>52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct employment</td>
<td>--</td>
<td>--</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not recommended for train.</td>
<td>4</td>
<td>10</td>
<td>4</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Placed in the industries</td>
<td>18</td>
<td>23(3)</td>
<td>10</td>
<td>51(3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Status: End of Sept. 89</td>
<td>16</td>
<td>20(3)</td>
<td>6</td>
<td>42(3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>End of industrial period</td>
<td>16</td>
<td>18(3)</td>
<td>5</td>
<td>39(3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start of instrut. period</td>
<td>16</td>
<td>15(1)</td>
<td>5</td>
<td>36(1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade Test II taken (1990)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade Test II passed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Nos. in ( ) : Placement in the industries, although trainees had failed the Grade III test.

Intake and Follow-up, Batch 88

Table VI/2

1.3 Comparison of the Drop-outs (Batch 87 and 88)

Comparing the initial drop-out, both batches show a different tendency at the very beginning: 15% (Batch 87 - Table VI/1) and 24% (Batch 88 - Table VI/2) of the trainees drop out within a few days after the start of the training (admission = 100%). The development of the drop-out for the respective first years of the institutional training is shown in Tables VI/3 and VI/4, wherein the "realistic intake" is redefined with 100%. The figures for
1.4. Public Relation Campaign, April 1989

From the experiences during the recruitment of Batch 87 and Batch 88, it was decided to start a public relation campaign with the following aims:

1. Introducing the Pak-German T.T.C. and its training scheme to the population of the Bela District.

2. Making teachers and officials aware of the programme and its opportunity for the youngsters in their villages.

3. Lifting the image of the vocation of a maintenance mechanic, a trade high in demand in the industries but of low social status within the population.

4. Attracting applicants with middle pass, who might not know about their chances in this training institute.

5. Publishing the dates of application, entrance test, and start of classes 1989.

6. Distributing leaflets (Appendix VI/1) and application forms.

To achieve these aims, it was decided to present the T.T.C. physically and directly to the people in the towns.

For transport, a local bus was hired and at the stops, local music was played. All leaflets and posters were written in Urdu. Modern equipment and teaching devices were shown outside and inside the bus, the visitors were encouraged to touch the objects and put the experiments into action. Special emphasis was given to the trade of the maintenance mechanic, explaining its wide range of required skills and knowledge: machine work, welding, hydraulics and pneumatics. Pakistani instructors accompanied the tour, ready for explanations. On request of the principal, each day one of the German advisers went along, in order to "polish" the image of the T.T.C.s, which, unfortunately, is generally low in the province.

The tour took 6 days, covering the following places: Bawani, Gadani, Vinder, Sonmiani, Uthal, Bela, Lakhra, Liari, Khari—all situated in Las Bela District (refer to Map VI/1). The stop-overs were mainly at the local high schools or within the centre of the towns (refer to Photos VI/1-3). It was a success as far as its attraction to the people in the towns and villages. Instructors had the chance to explain the training scheme to youngsters, parents, teachers and officials. The result can be pinpointed in the increased number of applications and the number of trainees for the Batch 1989 (refer to Table VI/5). The trade of the maintenance mechanic is still less attractive, but the utilization of the training places is very satisfactorily.
1.5. Documentation of the Public Relation Campaign
("Educational Caravan")

Local people are attracted by the display
Photo VI/1

A keen interest in the pneumatic display
Photo VI/2

"Future" trainees in front of the electric showboard
Photo VI/3
Location of Hub Chowki within the Las Bela District as well as the different stations of the "Educational Caravan"
As a side effect it could be observed that the instructors were proud to demonstrate the equipment and to represent "THEIR" Technical Training Centre. This identification with the T.T.C. had been missing from the beginning, and this tour has improved the situation.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Electr.</td>
<td>Mechanic</td>
<td>Machinist</td>
<td>Total</td>
</tr>
<tr>
<td>Capacity</td>
<td>24</td>
<td>40</td>
<td>16</td>
<td>80</td>
</tr>
<tr>
<td>Applications Matric/Middle</td>
<td>26/19</td>
<td>25/20</td>
<td>26/14</td>
<td>77/53</td>
</tr>
<tr>
<td>Suitable candidates</td>
<td>22/5</td>
<td>24/13</td>
<td>22/9</td>
<td>68/27</td>
</tr>
<tr>
<td>Admission (July 29th, 89)</td>
<td>22/4</td>
<td>20/13</td>
<td>20/9</td>
<td>62/26</td>
</tr>
<tr>
<td>Intake (realistic status)</td>
<td>22/4</td>
<td>18/13</td>
<td>17/7</td>
<td>57/24</td>
</tr>
<tr>
<td>Status end of Sept. 90</td>
<td>20/4</td>
<td>23/13</td>
<td>14/7</td>
<td>57/24</td>
</tr>
<tr>
<td>Status at start of 2nd term</td>
<td>18/2</td>
<td>21/13</td>
<td>14/5</td>
<td>53/20</td>
</tr>
<tr>
<td>Trade Test III taken (1990)</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Trade Test III passed</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
</tbody>
</table>

Intake and Drop-out, Batch 89

Table VI/5

2. Introducing the Institute and its Training Scheme to the Industries

The second target group of the T.T.C., after the youngsters in the district, are the local industries in the Hub area. Their co-operation is required for the success of the training scheme in several ways:

- Providing suggestions for the required skills and knowledge to be incorporated in the curriculum;
- Providing training places for the apprenticeship training;
- Organizing the in-plant training in their specific factories to make the training fruitful;
- Cooperating with the T.T.C. in questions of training and discipline;
- Encouraging their unskilled and/or semi-skilled workers to attend the training at the T.T.C.;
- Nominating persons as "Training In-Charge" to bring the contact down to a less formal level;
up-grading their "Training In-Charge" with regard to training methods/organization, curricula.

The co-operation required could only be reached with a comprehensive information of the people concerned. The following initiatives were undertaken:

2.1 Information of the managers during the census in January 1987 (refer to Chapter IV)

2.2 A 2-days workshop was conducted at the Pak-German T.T.C. in collaboration with the National Training Bureau, Islamabad (Nov. 17th/18th 1987)

Besides the speakers and official guests, 12 of the participants came from factories on the managing level. The following topics were lectured on or discussed:

- National vocational training project phase I & II, aims, objectives and programmes;
- apprenticeship/in-plant training as a major source of skilled manpower;
- apprenticeship training in Pakistan;
- role of the Regional Directorates of Apprenticeship Training in the provinces;
- professional and administrative standards as laid down in the Apprenticeship Ordinance 1962 and Rules, 1966;
- the role of the Pak-German T.T.C. in the development of skilled manpower for the industries at Hub Chowki;
- the vocational training scheme of the Federal Republic of Germany as one possible way of co-operation between the technical training centres and the industries.

The response was very positive, and fruitful connections were made with respect to the placement of apprentices in the factories.

2.3 The field survey of Febr. 1988 was another opportunity to make relations with the industries and convey the information. (refer to Chapter v)

2.4 In May 1988, during the last days of training before the Trade Test III was conducted, engineers and managers were invited to observe the training in an "open house event". Although invitations were sent well in time, the response was
very little during the first day. Only personal contact by telephone made it a success in the end. Managers and engineers talked to the trainees and most of them could be placed as apprentices straight away, or, at least, after a few days. (Refer to Table VI/1) The visitors were impressed with the training results, reached within one year of training.

2.5 Since the placement of the first trainees as apprentices, the regular visits to their training/work places gave excellent opportunities to convey messages, ideas, and information. The visitors from the T.T.C. were well received and they were given the chance to talk to the trainees and their foremen.

2.6 For the placement of the second batch (Batch 88) in the industries, the following steps were undertaken:

- Information about the problems concerning the industrial training and pre-announcement of the "open days" 21st/22nd May, 89 (Appendix VI/1);

- Personal visits of the writer, together with the principal of the T.T.C. to 17 companies, explaining the changed scheme and inviting for the "open days";

- Invitation of 5 more companies by phone/messenger.

All companies expressed their full co-operation and promised to attend the "open days". However, the "open days" were a complete failure with only two visitors from one company. Since it had to be assumed that the companies were not willing to cooperate according to the requirements of the Government of Baluchistan, an adequate letter was sent to the companies (Appendix VI/3). This letter proved to be fruitful (refer to Table VI/2), and all but six trainees from the electrical section could be placed in the industries at Hub. These six maintenance electricians could be placed at Siemens/Karachi. Soon after the start of the training, in August 89, the lack of an apprenticeship officer became obvious, again, in an almost dramatic aspect:

Going against the agreement (Appendix VI/2), one factory paid a higher allowance than 300.--Rs to their trainees. This "good news" spread out to the other trainees and they demanded the same payment from their factory. It came to disagreements resulting in the hijacking of a manager's car. Three trainees were taken into custody, but were later released on demand of a high official from Quetta. The trainees were sent back to their factory, even without being asked to apologise for their bad deed. In a later meeting with the factory managers, one could easily realize that the willingness to participate in the scheme had decreased quite a bit, and only due to pressure from the Provincial Government they kept going. Under these conditions it is questionable, whether it will be possible to train youngsters as skilled workers, who do not only know the required skills but are
also willing and able to adopt themselves to the industrial environment with all the rights plus the duties.

3. Evaluation and Further Planning

In April 1989, a 3-weeks evaluation and planning workshop took place, in which the writer was a member of the evaluation team. The aim was an evaluation of the progress and the planning for the next project period 1990/93. It is not the intention of the writer to give a report on the workshop, but to present the major problems, their causes, and measures for the improvement of the situation.

The Problems:

Three major problems were found, which hamper the progress of the project:

3.1 The training scheme is not well accepted by the trainees and the local industries.

3.2 The instructors are not qualified to the standard required.

3.3 Trainees and instructors do not identify themselves with the Pak-German T.T.C. Hub Chowki.

These three problems were considered vital to such an extent, that other problems of administration and organization could only get minor mention.

3.1.1 Problems within the Scheme

The up-to-that-date running system of an institutional training leading to Trade Test Grade III, followed by an apprenticeship training of two years with sandwiched up-grading courses, leading to Trade Test Grade II, did not work satisfactorily:

- After 8 months of industrial training, only 46% of the apprentices were still in the factories, although 68% appeared for the 4th up-grading course (refer to Table VI/1). The difference represents the number of former apprentices who have taken up employment (machinist, plumber, tube well operator) or have started to study intermediate or graduate courses. The length of this training scheme (three years) is not acceptable for the trainees under the present conditions.

- For trainees with matric certificates, this scheme competes in duration directly with the Diploma Courses of the Polytechnic Institute in Quetta, leading to a "Diploma Holder" rather than a "Certificate Holder".

- For trainees with middle pass, who generally come from lower income groups, a three year course keeps them away for too long
a time from a regular employment from which they could make their living.

- For both groups it is true, that even 1/2 year courses lead to a "Certificate", and industries do not even make a real difference between the certificates awarded to the trainees.

3.1.2 Problems regarding the Implementation of the Scheme

Not only the scheme itself, but also the implementation of the apprenticeship part faced a lot of problems:

- Industries complain about lack of interest and absenteeism of the apprentices:
  - The trainees had difficulties to adapt themselves to the industrial environment.
  - The trainees come from different places in the province and in cases of private problems, they tend to go home and stay away for some time unexcused.

- Apprentices complain about their misplacement as cleaners and helpers:
  - Although the managers were well informed about the aims and content of the training, as well as the pre-qualification of the apprentices, the placement of the apprentices to the workshops was done without conveying this information to the workshop in-charge.
  - The placement of the apprentices to the workshops was done without information about the aims and contents of the training, as well as the pre-qualification of the apprentices.
  - Individual foremen and workers use the apprentices as cleaners and helpers.
  - Apprentices are not guided properly, because some workers fear competition.

The T.T.C. did not have a close enough contact with the industries to solve the problems right from the beginning:

- The T.T.C. has no apprenticeship officer to be in permanent contact with the industries.
- The industries have no training in-charge appointed.
The Gatron Polyyarn factory may serve as an example for shifting apprentices from factory to factory and for drop-outs. This factory was found very suitable for the maintenance trades and the management was very enthusiastic about the training scheme. One part of the factory was operating already, while a new section was under construction, giving first rate opportunity to learn about the modern installation of control technology etc. Despite this chance, 5 out of 6 trainees dropped-out or changed the factory within a short time (refer to Table VI/6).

<table>
<thead>
<tr>
<th>Trainee</th>
<th>1st Factory</th>
<th>2nd Factory</th>
<th>3rd Factory</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mohd. Akbar</td>
<td>Gatron</td>
<td>Bal. Wheels</td>
<td>---</td>
<td>satisfied</td>
</tr>
<tr>
<td>Abdul Sattar</td>
<td>Gatron</td>
<td>Polymere</td>
<td>Polyrone</td>
<td>satisfied</td>
</tr>
<tr>
<td>Abdul Nasir</td>
<td>Gatron</td>
<td>---</td>
<td>---</td>
<td>drop-out</td>
</tr>
<tr>
<td>Ghulam Sarwar</td>
<td>Gatron</td>
<td>---</td>
<td>---</td>
<td>unsatisfied</td>
</tr>
<tr>
<td>Manzoor Ahmed</td>
<td>Gatron</td>
<td>Polymere</td>
<td>---</td>
<td>drop-out</td>
</tr>
<tr>
<td>Ghulam Rasool</td>
<td>Gatron</td>
<td>Polymere</td>
<td>---</td>
<td>drop-out</td>
</tr>
</tbody>
</table>

Shifting/Drop-out

Table VI/6

In discussions with the management of Gatron it turned out, that the apprentices were placed to the shop floor and nobody was in charge anymore. The apprentices were used as helpers and cleaners, although excellent training opportunities with the most modern equipment and skilled manpower was available.

Quite a difference is to be noticed in the Balochistan Wheels Ltd., and one sentence of the manager may demonstrate the situation there: "It is important, that the apprentice realizes, that his work is useful for him and for the company."

3.1.3 The Development of the local Industries at Hub

The slow pace of development of the industries at the Hub area does not ensure enough training places. The existing training places must be utilized at a higher frequency and efficiency.

3.1.4 Introduction of a revised Training Scheme

From the foregoing discussion one can derive that an immediate and radical change of the scheme and its implementation is necessary to make the project a success. The revised scheme has
to consider the needs of the trainees for a shorter training, but has to utilize the training potential of the local industries. The following scheme was proposed to the Directorate Labour Manpower in Quetta and subsequently was introduced in the school year 1989/90. Every effort was made, to make the industries cooperate in this scheme, in order to make it a success.

```
  1/2 year  Institutional Training  Pass (skilled workers  Outs  Trade Test Grade II)
  1/2 year  Industrial Training
  1 year    Institutional Training
          Basic Year
```

Training Scheme, Start 89/90

Figure VI/1

Explanation to the Scheme (Figure VI/1)

The Basic Year (Institutional Training) will be conducted, as before, without a change of the training places available (160 training places per year). After the Trade Test Grade III the trainees may either pass out and take up employment in the industries or opt for a second year of training. This will consist of an industrial part (1/2 year) with the following objectives:

- Get the trainees adopted to the industrial environment;
- apply skills and knowledge, acquired during the first year, to real tasks and objects;
- acquire new skills and knowledge by working on different tasks together with skilled workers;
- train acquired skills to a higher level by repeating different tasks several times.

This part of the training is performed in close co-operation between the T.T.C. and the industries, to ensure a training according to the needs of the trainees and the industries without "time-wasting".
To facilitate this close co-operation, the following arrangements are necessary:

- An apprenticeship officer has to be appointed by the Directorate Labour Manpower and to be stationed at the Pak-German T.T.C. This officer has to guide the apprentices and to advise the training in-charge at the factory, in questions of discipline, personal problems, training contents, workshop rotation plans.

- A "Training In-charge" has to be appointed by the factories. This person should be located at the middle management level to ensure that he is close enough to the shop floor and can arrange the training programme as well as attend the problems of the apprentices.

- The apprenticeship officer has to visit the factories regularly in order to solve the problems at the beginning.

- Workshops have to be organized to train the "Training In-Charge" for their important task within the training scheme.

The second half of the second year is devoted to imparting further skills and knowledge according to the curricula. Special emphasis is given to skills, which generally cannot be acquired in the local industries due to lack of machines or training opportunities. The previous "up-grading courses" are, of course, part of this half year.

It is assumed, that in future approx. 2/3 of the trainees will opt for the training leading to Grade II, and consequently the industries have to make available the following number of training places every half year:

| Maintenance Electricians | 16 places |
| Maintenance Mechanics    | 24 places |
| Machinists               | 12 places |
| **Total**                | **52 places** |

These numbers add up to a

\[
\text{Total of 264 Training Places}
\]

(2 x 80 = 160 training places in the first year, and 2 x 52 = 104 in the second year)

Since the 52 places are only needed for half a year and can after that be occupied by the next trainees, there is no culmina-
tion of necessary industrial training places. The industries are in the position to provide the places in quality and quantity, even considering the slow pace of development of the industrial area.

To make the scheme workable, the Directorate Labour Manpower has to ensure the industries, that by providing the training places they will comply with the Apprenticeship Ordinance. Furthermore, it is suggested that the amount of money paid by the industries during the industrial part of the training shall be 300.00 Rs, for every trainee. This amount is to be considered as a "factory allowance", while the stipend of 200.00 Rs is paid by the T.T.C. This split-up should afterwards make it easier for the students to accept the 200.00 Rs stipend during the last institutional part of the training.

3.1.5 Schedule of Implementation

The change to the new scheme is done with the intake 8/89. The intake 8/88 will not be effected because they have just finished the basic year of institutional training. For the intake 7/87 a transitional arrangement is needed because they have completed one year of industrial training, already, together with four up-grading courses. For them, the up-grading courses 5 to 8 are offered in Oct./Nov. 89, ending with the Trade Test Grade II. The decision to drop the intake 1/90 should depend on the number of instructors available, and the current instructor training programme.

<table>
<thead>
<tr>
<th>7/87</th>
<th>1/88</th>
<th>8/88</th>
<th>1/89</th>
<th>8/89</th>
<th>1/90</th>
<th>8/90</th>
<th>1/91</th>
<th>8/91</th>
<th>1/92</th>
<th>8/92</th>
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</tbody>
</table>

Legend:  
- institutional training 1st year  
- industrial training  
- institutional training 2nd year  
- up-grading courses

Schedule of Intakes  

Figure VI/2  

74
3.1.6 Compliance with the National Training Standards

The new scheme is in compliance with the National Trade Standards, prescribing a two years institutional training for the skilled worker, because the industrial part of the training is to be considered as part and parcel of the training scheme, locally adopted to the industrial environment with the objectives stated before.

3.1.7 Opening the Training Scheme towards further Techn. Training

The technical training of a skilled worker is a dead end for the educational career of a trainee with a matric certificate. The modern industries with its advanced technology ask for people with such an educational background. Therefore, the training has to be made more attractive by opening the scheme towards the diploma course. The curricula of the Polytechnic in Quetta has been checked for this purpose and it was found, that a good part of the contents has been covered within the training towards the Trade Test Grade II. An additional 2 years would be sufficient to reach the diploma level. Most likely only a small group would make use of this possibility, but simply having this chance would make the scheme more attractive to the matric certificate holder.

Classes towards the diploma could be in the afternoon shift and hardly any extra equipment would be needed. Instructors involved in this type of afternoon shift would receive an additional 40 % increment in their salary, and by that, Hub Chowki would become more attractive to them. As a date to start this type of training, 8/90 could be envisaged.

3.2. Instructors are not qualified to the standard required

Being future civil servants for the Province of Balochistan, the selection of the instructors is done by the Directorate Labour and Manpower in Quetta. The restriction to Balochistanis only lowers the chance for getting qualified instructors, because the number of experienced people in the province is quite low and those tend to look for better paid jobs outside the government service. Furthermore, Hub Chowki is considered as an inattractive location, where the payment is even lower than in Quetta. All this results, in certain cases, to qualifications which are lower than those of a trainee after one year of training at the Pak-German T.T.C. Of course, it should be mentioned, that even under these adverse conditions, there is quite a number of willing and qualified instructors. To improve the standard, the following efforts were made:

- Internal training on teaching techniques;
- support and guidance when preparing the lessons;
- training on machines and in the lab;
- training on technical subjects;
- conducting courses in co-operation with the N.S.T.I. in Islamabad;
- sending instructors to the Staff Training Inst. in Lahore;
- organizing industry oriented training in modern factories;
- granting stipends for technical training in private institutes in Karachi;
- granting scholarships for further, long-term training in West Germany.

(For details and objectives refer to the unpublished dissertation of H.G. Beck, Karachi University)

3.3.1 High rate of drop-out and absenteeism of the trainees

The trainees come from traditionally tightly knit families, before they experience the separation from home. They have to stay in a hostel, and since there is no hostel warden present, the only substitute for the family is the Balochistan Students Organization (BSO). There are virtually no activities in the afternoons and evenings, and this leads to absenteeism and finally to drop-out (refer to Tables VI/1, VI/2, VI/3, VI/4).

E.g. The absenteeism for the period 8.88 to 2.89 for the Batch 88 averages to 19% with the extremes of 100% and 0% for certain months (figures consider the actual numbers of trainees for each month, not the initial intake. Over the total year 88/89 the following fraction of the trainees (Batch 88) were more than 20% absent:

Maintenance Electricians: 26%
Maintenance Mechanics: 50%
Machinists: 45%

With this high rate of absenteeism it is impossible to conduct a successful training, and hence, all trainees who failed the trade test came out of this group.

A permanent and dedicated warden is one answer to this problem. He may utilize the potential of the instructors to organize sports and clubs. This problem becomes more eminent during the industrial part of the training, when even the fellowship of the classmates is reduced to the evenings only. Here the apprenticeship officer and the warden have to work together.
In each factory with apprentices, there is a need for an appointed "Training In-Charge" on the middle-management level, guiding the trainees not only practically, but also, when personal problems come up.

3.3.2 The instructors' lack of identification with the F.G.T.T.C.

Instructors usually come from Quetta and are either transferred against their wishes or only accept Hub Chowki to get an initial appointment. Approx. 80% of the instructors have applied for a transfer to Quetta. This culminates into the fact that instructors misbehave towards their principal and advisers only to achieve their aim. Furthermore, there is a permanent problem of instructors applying for casual leave while classes are on. A grant of leave as well as its rejection; normally results into a 1 to 2 weeks stay with the family in Quetta, leaving the school and the duty neglected. Another point is the uneasiness of the instructors due to their lack of qualification. They tend to get sick leave or leave without permission whenever new tasks are ahead.

Some of the problems are basically the same as for the trainees (3.3.1), but the solutions have to be different. Although the provincial government has started to set up family accommodations, some measures still have to be taken to improve the situation:

- Training and up-grading the instructors (refer to 3.2.);
- organizing field trips, sport events etc. as a uniting experience;
- start of common projects for the improvement in the living conditions;
- supply of a common uniform during class time;
- set-up of an instructors' club.

The implementation of the foregoing measures could help to achieve the general aim of the project:

"The training of skilled Balochistani manpower, acceptable by the modern industries."

One will easily realize, that the solution to these shortcomings cannot be found by costly machines or buildings, but within managing of the institute and and the improvement of human relations.
CHAPTER VII

PROPOSED "COURSE OUTLINES" FOR

MAINTENANCE ELECTRICIAN (INDUSTRIES)

Besides the definition for the term "curriculum" given on page 8:

"A curriculum is an organized set of formal educational and/or training intentions",

there are numerous other ones. Many meetings of educators on the topic "curriculum" start with the job of finding a common definition of the term as a common working basis. During the initiation phase of the "National Occupational Skill Standard for Maintenance Electrician (Industries)", introduced by the writer, it was found that the ideas about a complete curriculum differ widely between the writer and the technical committee for electrical trades. Since a national curriculum does not have to satisfy a single person, but only the concerned government institutes and agencies, it was decided to prepare "course outlines" to be submitted to the National Training Development Institute. The "course outlines" include the topics to be taught, the time allocation, flow of training, connection between theory and practical training, places of learning, as well as the interlinking with the industries. The formulation of the objectives is missing, because that was one of the reasons for different opinions. Of course, for the instruction within this project the objectives were formulated together with the instructors, to define the training intention and make them clear to the instructors.

Comparative View of Different Curricula

The main source for consideration is the National Occupational Skill Standard as the official guideline. Other curricula are to be compared to this national standard, in order to give weight to the different headings by describing the relevant topics clearly enough.

<table>
<thead>
<tr>
<th>Curriculum/Trade Standard</th>
<th>Topics/objectives beyond this National Standard</th>
<th>Topics/objectives not included</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 1</td>
<td>Basic Level</td>
<td></td>
</tr>
<tr>
<td>National Occupational Skill</td>
<td>concept of construction</td>
<td>-basic training: metal;</td>
</tr>
<tr>
<td>of measuring instrum.;</td>
<td>-motor control circuits</td>
<td></td>
</tr>
<tr>
<td>Standard for</td>
<td>-twist joints, Britannia</td>
<td>-unbalanced 3-ph sys-</td>
</tr>
<tr>
<td>Electrical</td>
<td>joints;</td>
<td>-basic mechanical draw;</td>
</tr>
<tr>
<td>Wireman/Electrician</td>
<td>handling carpenter</td>
<td>-ac-circuits;</td>
</tr>
<tr>
<td>trician</td>
<td>tools, wooden joints;</td>
<td>-heat/temperature</td>
</tr>
<tr>
<td>National Training Board</td>
<td></td>
<td>-efficiency</td>
</tr>
<tr>
<td>Curriculum/Trade Standard</td>
<td>Topics/objectives beyond this National Standard</td>
<td>Topics/objectives not included</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------------------------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>Islamabad</td>
<td>Intermediate Level</td>
<td></td>
</tr>
<tr>
<td>1986</td>
<td>repairs of low medium voltage transformers</td>
<td>advanced motor control circuits;</td>
</tr>
<tr>
<td></td>
<td>sub-station erection and maintenance;</td>
<td>control circuits cum pneumatic;</td>
</tr>
<tr>
<td></td>
<td>rewinding of motors;</td>
<td>electronics/osilloscope/measurement;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>generator units;</td>
</tr>
<tr>
<td>No. 2</td>
<td>Basic Level</td>
<td></td>
</tr>
<tr>
<td>Curriculum Electrician</td>
<td>use of carpenter's tools;</td>
<td>unbalanced 3-ph systems;</td>
</tr>
<tr>
<td>National Training Board</td>
<td>extensive making of wooden joints;</td>
<td></td>
</tr>
<tr>
<td>Islamabad</td>
<td>Y-Delta switch and contactor circuits;</td>
<td></td>
</tr>
<tr>
<td>1986</td>
<td>2-speed switch and contactor circuits;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>diff. 1-ph motors;</td>
<td></td>
</tr>
<tr>
<td>No. 3</td>
<td>Basic Level/Intermediate Level</td>
<td></td>
</tr>
<tr>
<td>Masterplan for curriculum for apprentices &amp; trainees Development Cell-Lahore Government of the Punjab 1977</td>
<td>valve rectifiers</td>
<td>advanced motor control circuits;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>control circuits cum pneumatic;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>electronics beyond the retifier circuits;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>osilloscope/measurement;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>generator units;</td>
</tr>
<tr>
<td>No. 4</td>
<td>Basic Level</td>
<td></td>
</tr>
<tr>
<td>Curriculum Basic Training Electrician Government of Lower Saxony West Germany 1979</td>
<td>science;</td>
<td>basic motors;</td>
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<tr>
<td></td>
<td>extended mathematics;</td>
<td>3-ph systems;</td>
</tr>
<tr>
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<td>logic functions;</td>
<td>3-ph control circuits;</td>
</tr>
<tr>
<td></td>
<td>extended materials;</td>
<td></td>
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<tr>
<td></td>
<td>preparation of printed circuit board/basic electronics;</td>
<td></td>
</tr>
<tr>
<td>No. 5</td>
<td>Basic Level</td>
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</tr>
<tr>
<td>Trainings Or Organization: Electrician Industrial plants Ministry of</td>
<td>oscilloscope, PCB;</td>
<td>basic motors;</td>
</tr>
<tr>
<td></td>
<td>basic electronics;</td>
<td>3-phase systems;</td>
</tr>
<tr>
<td></td>
<td>science/mathematics;</td>
<td>3-phase control circuits;</td>
</tr>
<tr>
<td></td>
<td>materials;</td>
<td></td>
</tr>
</tbody>
</table>

79
Comparing the 5 different trade standards/curricula leads to the following conclusions:

No.1 Although this trade standard was developed in 1986, the contents of the basic level seems to be partly a copy of a pre-independence standard (British) with a lot of carpentry, while basic as well as modern technologies are missing.

For the intermediate level, the technical committee seems to have been dominated by WAPDA members, who included a lot of topics relevant to their field, but modern installation techniques, electronics, and generator units were left out.

No.2 The "Curriculum Electrician" was developed in 1986 and was supposed to be based on the basic level of No.1, but the two do not match at all. Control circuits go beyond the intermediate level of even the trade standard, only the excessive carpentry is similar. This curriculum shows the need for improvement in the field of curriculum development. It is not possible to cover vast fields of technology in a few words, without giving the desired degree of learning (objectives) and the time allocation. This will lead to a "hidden curriculum", where instructors follow their own individual pace of teaching. Results can no longer be compared, and only by chance the contents of learning applies to the needs of the trade and the trainees.

No.3 This "masterplan – curriculum" was prepared by the Development Cell in Lahore in 1979, and does not distinguish between the basic and intermediate level. So as a result it is looked at as a whole. The curriculum is well organized, and only the valve rectifiers, obsolete in the meantime, go beyond the new National Standard. Adding electronics and some other modern techniques, this curriculum could have been a good base for the work in the National Development Institute. Could the location of the institutes, provincial – federal, be the stumbling block?

No.4 This curriculum, on the basic level, was developed in West Germany in 1979 and goes beyond the National Standard in the fields of mathematics, science, materials and electronics, while it does not reach up to the 3-phase systems. This is caused by the fact, that this basic year is only the first part of a three-year course. A broader basic level is desi-
red, while there is still time for specific electrical technology during the other years.

No. 5 This training ordinance of 1987 is the start of a complete renewal of technical training in W. Germany, a massive introduction of modern technology starting at the basic level already. As in No. 4, emphasis is given to mathematics, science, materials, electronics, and measurements, while parts of the electrical technology are lagging behind during the first year. At the intermediate level electronics is leading even further. The two levels described are the first two years of a 3.5 year training.

All five trade standards/curricula have in common, that they are not concered with generator units. This is understandable for the German curricula, but not for the first three ones. Loadshedding and black-outs are common, and most industries have their own stand-by units. High investments are left to the operation of untrained workers, resulting in technical problems and financial losses.

Requirements of the Industries

The requirements of the industries were investigated during the census of 1987 and are stated in Chapter IV p. 45. The demand of the industries is not surprising because their stated needs are exactly missing in the trade standards/curricula No.1-3, and have, therefore, not been taught. Furthermore, there was a high demand for even a separate trade of a power generation mechanic. Since it is not offered, for the time being, knowledge and skills of this field have been included, together with the other requirements of the industries, in the National Occupational Skill Standard Maintenance Electrician (Industries). Besides these requirements, during visits to the industries, other demands were raised, which can be referred to the "affective domain" of the Bloom's Taxonomy: punctuality, reliability, perseverance, tidi-ness, etc. traits which have partly not been developed in a rural society, but are required in an industrial environment.

Requirements for the Trainees

Individuals are generally not asked about their needs when it comes to contents of training. The "society" through the government and/or groups of common interests exert influence on the aims and contents. Depending on the degree of governmental influence, the demands of the society beyond the interests of the industries are more or less taken into account (refer to Chapter III). Individual interest in security, and a stable source of income even in future can only be reached by a broad, future oriented training together with a system of life-long up-grading. The society has to decide about the degree of qualitative training for the individual and the quantitative training for the broad masses. The project itself can try to implement the new National Standards and guide the trainees towards the aim of becoming skilled workers, acceptable for the modern industries.
Course Outline (Basic Level - Grade III)

Taking into consideration

the requirements of the industrious,
the requirements for the trainees,
the existing occupational skill standard,
the proposed training scheme (Chapters III a. VI),

the proposed course outline for the first year of training is developed in such a way that the educational/training intentions can be reached within 5 days of practical and one day of theoretical training per week for a total of 42 weeks. By this ratio of practical/theoretical training, the aim of the scheme becomes obvious, the training of craftsmen.

The separation of practical and theoretical training with regard to time and place, rather than an integrated approach, was chosen for the following reasons:

- the instructors, available, are not in the position to cover both parts of the instruction well enough (the instructors for the practical training have a poor theoretical background, while the instructors for theory have done a diploma course at the poly-technic institute, with a minimum of practical training - refer to Chapter II p.12);

- by separating the theory from the practical training, the pre-requisites are met, to utilize the prepared lessons for evening classes, too, where skilled workers are invited to upgrade their theoretical knowledge;

- a synchronous approach of theory classes with the practical training is not possible, since the basic theoretical knowledge, needed for the trade knowledge later, is very often not relevant for the skills acquired in the workshop at that time.

This separation of the theory classes could have serious drawbacks, because the trainees, very often, cannot understand the relation of these classes to their own main activity, the training the workshops.

...Perhaps above all, the content of the lesson must be meaningful to the learner if it is to lead to firm retention and swift recall. Meaningful material is usually remembered more clearly and for longer periods of time than that which has little or no relation to the students' level of learning at the time of the lesson. 1)

To overcome this problem, the theoretical training is centred around the lab. classes, in order to give a meaningful, "practical" approach. That theoretical knowledge, that has a direct connection to the workshop practice, should be taught in the

way of "shop-talks", that means lessons in the workshop, whenever the progress of work requires them.

Content and Organization of the First Year

<table>
<thead>
<tr>
<th>Unit</th>
<th>Weeks</th>
<th>Topics</th>
</tr>
</thead>
</table>
| 1    | 8     | Basic Training: Metal Work  
- workshop safety, care of tools, basic skills of metal work, measurements, small workpieces related to electricians' work; |
| 2    | 2     | Basic Training: Electrical Work  
- work safety, care of tools, preparation and trimming of wires/cables, preparation of different joints, colour code for wires/cables; |
| 3    | 8     | Wiring I  
- electrical safety, tracing/reading of circuit diagrams, installation of light/bell circuits with various material, checking/fault finding |
| 4    | 3     | Electrical/Mechanical Work  
- manufacturing of a useful component, integrating the mechanical and electrical skills, safety, and function tests; |
| 5    | 5     | Repair and Maintenance  
- repair and maintenance of electrical appliances/motors, reading of circuit diagrams/tables/maintenance plans, measurements, safety; |
| 6    | 5     | Wiring II  
- electrical safety, tracing/reading of circuit diagrams, protective devices, complex installations with power supply; |
| 7    | 5     | Basic Motor Control Circuits  
- motor control circuits for 3-phase and 1-phase motors, drum switches, contactor circuits, circuit functions, measurements; |
| 8    | 5     | Wiring III  
- motor control circuits—using industrial installation techniques, regulations for industrial wiring, fault finding, measurements; |

Final Test | Trade Test Grade III

Topics of the Practical Instruction  
Institutional Basic/Trade Training towards Grade III

Topics of Practical Training, Grade III  
Table VII/1

83
The topics of the practical training are covered in 8 different units (refer to Table VII/1). The requirements of the relevant national occupational skill standard are fully met, and especially, the four units of the second half of the year, being complete courses in themselves, can be utilized as evening courses.

The topics for the theoretical instruction are shown in Tables VII/2-1,2,3. As said before, no attempt was made to synchronize theory and practical training completely. Certain simple skills, for example, utilize equipment of complex technology. At the beginning of training, without the fundamentals of electrical engineering, this would not be understood by the trainee.

This information must, therefore, be postponed to a later stage. Hence, an internal logical structure has to be developed for the theory classes, permitting meaningful teaching. Classes are divided into four subjects, but these are interlinked in such a way, that the separation almost disappears and a topic is covered by teaching it with the lab. classes as the centre point. The time allocation is approximate only, and only one instructor should be involved in the lessons, to ensure the "horizontal interlinking" of the subjects. The vertical sequence follows the logical pattern of the electrical science, covering all topics required by the relevant national occupational skill standard.

Even though, a synchonization has been found over longer periods:

- Unit 1 (Basic Metal Work, 8 weeks) is accompanied by the first 8 weeks of theoretical classes, covering mechanical drawing, revision of basic mathematics, as well as mechanical measurements and properties of materials.

- Unit 3 (Wiring I, 8 weeks) is preceded by the first two lessons in the electrical field, covering the cells, batteries, voltage and current measurement, as well as the lab. diagrams. The unit 3 is accompanied by the coverage of the basic installation circuits in the lab. and drawing classes, resulting in an almost 100% parallel instruction.

- Another parallel approach is found for the Unit 7 (Basic Motor Control Circuits, 5 weeks), and for the Unit 8 (Wiring III, 5 weeks).

Within a number of days, the synchronization is not possible, hence, technological knowledge sometimes leads and sometimes lags behind the practical skills. It should be remembered that a direct technology transfer takes place during practical work, explaining the "How" but not the "Why". In this way, skills are taught, even with a certain lack of theoretical knowlege at that time. 1)

1)Karing, Peter How can the training capacity of the factories be utilized in full? Mannheim: DSE 1986
<table>
<thead>
<tr>
<th>Week</th>
<th>Technology* 3 Per.</th>
<th>Lab.* 0/2 Periods</th>
<th>Math.* 2/1 Periods</th>
<th>Drawing* 2/1 Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>measuring tools</td>
<td>metric system</td>
<td>lines/letter/tools</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>handling of rulers</td>
<td>reading of scales</td>
<td>flat pcs.-straight</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>venier calipers</td>
<td>conv. inch-metric</td>
<td>flat piece-circles</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>materials/propert.</td>
<td>decimal fractions</td>
<td>3-views-introduct.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>importance/utilization of electr.</td>
<td>common fractions</td>
<td>3-views of work pieces</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>voltage/current</td>
<td>problem solving</td>
<td>cylindrical pieces</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>resistance/specif.</td>
<td>change of equa-</td>
<td>sections</td>
<td></td>
</tr>
<tr>
<td></td>
<td>res., colour code</td>
<td>tions I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>materials/propert.</td>
<td>change of equa-</td>
<td>inner/outer thread</td>
<td></td>
</tr>
<tr>
<td></td>
<td>in electr. engin.</td>
<td>tions II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>cells/batteries</td>
<td>introduction to</td>
<td>percentage</td>
<td>lab. diagram 1</td>
</tr>
<tr>
<td></td>
<td>lab./safety rules</td>
<td>lab./safety rules</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>relation V—I, I—R</td>
<td>measurement of V,</td>
<td>accuracy of meters</td>
<td>lab. diagram II</td>
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<tr>
<td>11</td>
<td>Ohm's Law</td>
<td>Ohm's Law</td>
<td>Ohm's Law</td>
<td>lab. diagram III</td>
</tr>
<tr>
<td>12</td>
<td>voltage drop</td>
<td>measurement of R</td>
<td>voltage drop, re-</td>
<td>symbols in elec-</td>
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<td></td>
<td>cables/wires</td>
<td></td>
<td>sistance of wires</td>
<td>tric circuits</td>
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<td>13</td>
<td>series connection</td>
<td>series connection</td>
<td>series connection</td>
<td>single-pole switch</td>
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<tr>
<td></td>
<td>of resistances</td>
<td>single-pole switch</td>
<td>of resistances</td>
<td>circuit</td>
</tr>
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<td>14</td>
<td>parallel connect.</td>
<td>parallel connect.</td>
<td>parallel connect.</td>
<td>multi-circuit</td>
</tr>
<tr>
<td></td>
<td>of resistances</td>
<td>multi-circuit sw.</td>
<td>of resistances</td>
<td>switch</td>
</tr>
</tbody>
</table>

* For the purpose of this table, the terms 'Technology', 'Lab', 'Math', and 'Drawing' are represented by 'Technology*', 'Lab.*', 'Math.*', and 'Drawing*', respectively.
<table>
<thead>
<tr>
<th>Week</th>
<th>Technology</th>
<th>Lab</th>
<th>Math</th>
<th>Drawing</th>
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<td>15</td>
<td>par./series conn</td>
<td>par./series conn</td>
<td>parallel/series</td>
<td>two-way switch</td>
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<td>two-way switch</td>
<td>connection</td>
<td>circuit</td>
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<td>intermediate</td>
<td>fuse ratings</td>
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<td>fuses/circuit br.</td>
<td>switch</td>
<td></td>
<td>switch circuit</td>
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<td>electric power</td>
<td>power measurement</td>
<td>electric power</td>
<td>combin. of circ.</td>
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<td>electric work</td>
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<td>half-year test</td>
<td>half-year test</td>
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<td>magnetic values</td>
<td>impulse relays</td>
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<td>circuit</td>
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<td>time switch</td>
<td>magnetic values</td>
<td>time switch</td>
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<td>conductors/coils</td>
<td>circuit</td>
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<td>circuit</td>
</tr>
<tr>
<td>24</td>
<td>magnetic fields of</td>
<td>contactor</td>
<td>magnetic values</td>
<td>contactor</td>
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<td>coils w/ core</td>
<td>circuit I</td>
<td></td>
<td>circuit I</td>
</tr>
<tr>
<td>25</td>
<td>electric field/</td>
<td>contactor</td>
<td>connection of</td>
<td>contactor</td>
</tr>
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<td>capacitors</td>
<td>circuit II</td>
<td>capacitors</td>
<td>circuit II</td>
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<td>induction by mo-</td>
<td>tube light with</td>
<td>Phythagorean</td>
<td>tube light circuit</td>
</tr>
<tr>
<td></td>
<td>tion, Lenz' Law</td>
<td>measurements</td>
<td>theorems</td>
<td>with contactor</td>
</tr>
<tr>
<td>27</td>
<td>mutual induction/</td>
<td>voltage stabilizer</td>
<td>transformer ratios</td>
<td>transform. symbols</td>
</tr>
<tr>
<td></td>
<td>transformer princ.</td>
<td></td>
<td></td>
<td>transform. circuit</td>
</tr>
<tr>
<td>Week</td>
<td>Technology^a 3 Per.</td>
<td>Lab.^a 2 Periods</td>
<td>Math.^a 1 Period</td>
<td>Drawing^a 1 Period</td>
</tr>
<tr>
<td>------</td>
<td>------------------</td>
<td>-----------------</td>
<td>------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>28</td>
<td>self induction</td>
<td>tube lamp lead/lag</td>
<td>sine - cosine</td>
<td>tube lamp lead/lag</td>
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<tr>
<td>29</td>
<td>ac-induction sine wave, Veff, Ieff</td>
<td>inductance at ac and dc</td>
<td>V, I, P in ohmic ac circuits</td>
<td>sine wave incl. character. values</td>
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<tr>
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<td>XL - Xc reactance</td>
<td>measurem. of Xc/C</td>
<td>calc.: C out of Xc</td>
<td>sine wave/ph. shift</td>
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<td>circuits with R, XL, Xc</td>
<td>series connection of R and XL</td>
<td>R - XL circuit</td>
<td>vectors with XL and R</td>
</tr>
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<td>P in ac-circuits</td>
<td>contactor III</td>
<td>P in ac-circuits</td>
<td>contactor circ.III</td>
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<td>cos phi/improvem.</td>
<td>contactor IV</td>
<td>cos phi/improvem.</td>
<td>contactor circ. IV</td>
</tr>
<tr>
<td>34</td>
<td>3-ph. systems</td>
<td>contactor V</td>
<td>angles and vectors</td>
<td>3-ph/4-wire system</td>
</tr>
<tr>
<td>36</td>
<td>△-connection</td>
<td>Δ-conn. (V, I, P)</td>
<td>Δ-conn. (V, I, P)</td>
<td>ON/OFF switch-3 ph</td>
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<tr>
<td>37</td>
<td>3-phase system unbalanced</td>
<td>unbalanced load, forward-rev. switch</td>
<td>current in N-conductor</td>
<td>forward-rev. switch circuit</td>
</tr>
<tr>
<td>38</td>
<td>types of motors</td>
<td>forw.-rev. contac.</td>
<td>manufact.'s plate</td>
<td>forw.-rev. contact.</td>
</tr>
<tr>
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<td>protective systems</td>
<td>protective Syst. earth leakage br.</td>
<td>V, I in protective systems</td>
<td>earth leakage circuit breaker</td>
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<tr>
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<td>3-ph power/work meters</td>
<td>measurem. of P/W in 3-ph systems</td>
<td>calculat. of P/W in 3-ph systems</td>
<td>P/W measurement in 3-ph circuits</td>
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<td>advanced meters</td>
<td>adv. meter circuits</td>
<td>accuracy of meters</td>
<td>meter symbols</td>
</tr>
<tr>
<td>42</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Trade Test Grade III
Considering the limited number of specific training places for the second half of the first year (half of the intake capacity), groups have to be formed. Observing the necessary sequence of the units

- Wiring II,
- Basic Motor Control Circuits
- Wiring III,

the following flow of practical training is suggested:

<table>
<thead>
<tr>
<th>Week</th>
<th>Unit</th>
<th>Group A (12 trainees)</th>
<th>Unit</th>
<th>Group B (12 trainees)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Basic Training: Metal Work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>2</td>
<td>Basic Training: Electrical Work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>3</td>
<td>Wiring I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>19</td>
<td>4</td>
<td>Electrical/Mechanic Work</td>
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</tr>
<tr>
<td>21</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>5</td>
<td>Repair and Maintenance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>6</td>
<td>Wiring II</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Basic Motor Control Circuits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>7</td>
<td>Basic Motor Control Circuits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>8</td>
<td>Wiring III</td>
<td></td>
<td></td>
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<td>9</td>
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<td></td>
</tr>
<tr>
<td>41</td>
<td>8</td>
<td>Wiring III</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Repair and Maintenance</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42</td>
<td></td>
<td>Trade Test Grade III</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Flow of Practical Training, 1st Year

The different flow of practical training for the two groups will disturb the synchronization between theoretical and practical classes, but meaningful training will still be possible due to the arrangements discussed before.
Course Outline (Intermediate Level - Grade II)

The course outline for the intermediate level has to take different organisational pre-requirements into consideration:

- The intermediate level should be organized as an industrial cum institutional training (refer to Chapter III p.37);

- the length of the industrial part of the training should be flexible, according to the development;

- in case of extreme problems with the industrial training, the course outline should serve as a base for a full institutional training;

- parts of the course should serve as evening courses for the workers already in the industries.

The possible answer to these pre-requirements is to form units (modules) for sets of topics, logically supplementing the in-plant training. These units must be complete in themselves in order to ensure a flexible application. Since the in-plant training has to be supplemented in theory, as well as practical instruction, both types of units have been developed.

Table VII/4 shows the units (topics) with a possible sequence and time allocation. Synchronization with the in-plant training is not possible, therefore, it is the aim to synchronize the units of the institutional training, or allow very short time gaps only. Besides "Theory" and "Practical", there is also the subject "Lab.". This does not imply that there is not the lab. centered approach for the theory classes, as in the first year, but it clarifies that for those units, the entire time is spent in the lab. (place of learning), and the teaching approach is "learning-by-doing", supplemented by short explanations only. For the electronic units, one of the instructors had to be trained, and this was taken as a chance to integrate even the theoretical part into the lab., reaching a 100% synchronization for Units 6 and 7. For Unit 5 the integration also is desirable, because for this subject only a little lab. equipment is available, and only the integration of theory and practice would lead to a meaningful teaching.

Tables VII/5-1,2,3,4,5 show the distribution of the topics to the different subjects. Contrary to the 1st year, no time allocation is given for the different subjects, because the length varies extremely, and the teacher has to allocate the time according to the objectives. This can be reached, when only one teacher is responsible for the four different subjects. As for the first year, the horizontal interlinking and the logical vertical sequence has been observed, and all topics of the National Occupational Skill Standard are fully covered.
<table>
<thead>
<tr>
<th>Unit</th>
<th>Weeks</th>
<th>Subj.</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Theory</td>
<td>Three-phase motors, motor protection, starting methods, applications;</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Pract.</td>
<td>Three-phase control circuits with fault finding;</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Theory</td>
<td>Single-phase motors, 1-ph/3-ph transf., instrument transformers;</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Pract.</td>
<td>Single-phase motor control circuits with fault finding;</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>Pract.</td>
<td>Industrial panel wiring with fault finding;</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Pract.</td>
<td>Systematic fault finding in advanced motor control circuits;</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>Theory</td>
<td>DC motors and generators, starting methods, measurements, applications;</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Lab.</td>
<td>Electr. control circuits cum pneumatic</td>
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<td>5</td>
<td>1</td>
<td>Theory</td>
<td>Generator units, diesel/petrol engines</td>
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<tr>
<td></td>
<td>1</td>
<td>Pract.</td>
<td>Generator units—operation/maintenance;</td>
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<td>6</td>
<td>1</td>
<td>Theory</td>
<td>Electronics I, measurements with multimeter and oscilloscope;</td>
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<td>1</td>
<td>Lab.</td>
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<td>7</td>
<td>1</td>
<td>Theory</td>
<td>Electronics II, measurements with oscilloscope, planning of project;</td>
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<td>1</td>
<td>Lab.</td>
<td>Advanced electronic circuits, project design and preparation, testing;</td>
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<tr>
<td>8</td>
<td>1(5)</td>
<td>Theory</td>
<td>Illumination, considering technical/economical needs, light measurement;</td>
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<tr>
<td></td>
<td>Pract.</td>
<td>Design/planning/wiring of control circuits/projects, commissioning/testing;</td>
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</table>

**Final Test**  | **Trade Test Grade II**

**Topics/Sequence of Theory/Lat./Practical Classes**

**Institutional Part of the Trade Training towards Grade II**

**Units for the Trade Training, Grade II**

Table VII/4
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<thead>
<tr>
<th>Topic</th>
<th>Technology</th>
<th>Lab.</th>
<th>Mathematics</th>
<th>Drawing</th>
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</thead>
<tbody>
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<td>Unit 1</td>
<td>3-ph Motors/ Protection</td>
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<tr>
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<td>motor protection name plates</td>
<td>cos-phi, slip</td>
<td>wiring diagram</td>
</tr>
<tr>
<td>2</td>
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<td>I/V/P in Y-Δ connection</td>
<td>Y-Δ switch circuit</td>
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<td>Y-Δ contactor</td>
<td>P in Y-Δ, η</td>
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<tr>
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<td>starting resist.</td>
<td>slip-ring motor with time relays</td>
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<td>2-speed motor</td>
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<td>poles/speed</td>
<td>2-speed motor switch/contactor</td>
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<tr>
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<td>1-ph. transformer</td>
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<td>4</td>
<td>3-ph. transformer</td>
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<td>5</td>
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<td>Topic</td>
<td>Technology</td>
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<tr>
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<td>1 dc-motors, types principles</td>
<td>testing of starters/controllers</td>
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<tr>
<td>2 series wound motor</td>
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<tr>
<td>3 shunt wound motor sep. exited motor</td>
<td>shunt wound motor</td>
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<tr>
<td>4 compound wound motor</td>
<td>separate exited motor</td>
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<tr>
<td>5 dc generators</td>
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<td>manufacturer's plate, manuals</td>
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<td>2 diesel engines</td>
<td>manufacturer's plate, manuals</td>
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<td>3 1-ph generators</td>
<td>manufacturer's plate, manuals</td>
</tr>
<tr>
<td>4 3-ph generators</td>
<td>3-ph generator plate, manuals</td>
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<td>5 starting and switching</td>
<td>automatic switch over</td>
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<tr>
<td>Topic</td>
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<td><strong>Unit 6 Electronics I</strong></td>
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<td>2</td>
<td>2-channel oscilloscope-operation</td>
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<td>3</td>
<td>semi-conductor materials, diodes</td>
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<td>4</td>
<td>bridge rectifier charging capacitor</td>
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<td>5</td>
<td>smoothing/filter</td>
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<td>6</td>
<td>zener diode, voltage stabilizing</td>
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<td>7</td>
<td>transistor, types handling, use</td>
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<tr>
<td>8</td>
<td>reg. power supply fault finding</td>
</tr>
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<td>9</td>
<td>trans. as switch</td>
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<td>10</td>
<td>flip-flops</td>
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<td>11</td>
<td>photo components</td>
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<td>12</td>
<td>voltage dep. bistable flip-flop</td>
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<tr>
<td>Topic</td>
<td>Technology</td>
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<tr>
<td>1</td>
<td>multi-layer components, diac</td>
</tr>
<tr>
<td>2</td>
<td>evaluation of experiments</td>
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<tr>
<td>3</td>
<td>thyristor, specification/terminals</td>
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<tr>
<td>4</td>
<td>thyristor as switch</td>
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<tr>
<td>5</td>
<td>evaluation of experiments</td>
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<td>6</td>
<td>U J Transistor pulse generator</td>
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<td>7</td>
<td>phase control by thyristor, distor.</td>
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<td>8</td>
<td>triac, specification/terminals</td>
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<td>9</td>
<td>planning, specification of project</td>
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<td>10</td>
<td>individual advice as needed</td>
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<td>11</td>
<td>presentation of project</td>
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<tr>
<td>Topic</td>
<td>Technology</td>
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<td>-------</td>
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</tr>
<tr>
<td>1</td>
<td>light, filament bulbs</td>
</tr>
<tr>
<td>2</td>
<td>low pressure mercury tubes</td>
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<tr>
<td>3</td>
<td>power factor, stroboscopic effect</td>
</tr>
<tr>
<td>4</td>
<td>special discharge tubes</td>
</tr>
<tr>
<td>5</td>
<td>planning of illumination</td>
</tr>
</tbody>
</table>

Trade Test Grade II
The revised training scheme, a first year institutional training and 6 months industrial/21 weeks institutional training for the second year (refer to Chapter VI p. 69), leads to a time allocation of four extra weeks beyond the B up-grading courses. These four weeks should be utilized for project work in the workshop, since the industrial part has been shortened. When adapting a different scheme in future (the aim still exists, to increase the industrial part of the training), these extra four weeks might be dropped again. To utilize the workshops and labs., according to their capacity, the following flow of training is suggested:

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<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Theo.</td>
<td>3-phase motors</td>
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<td>2</td>
<td>2</td>
<td>Theo.</td>
<td>1-phase motors, 1-ph/3-ph transformers</td>
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<td>3</td>
<td>1</td>
<td>Prac.</td>
<td>3-ph motor control circuits</td>
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<tr>
<td>4</td>
<td>2</td>
<td>Prac.</td>
<td>1-ph motor control circuits</td>
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<tr>
<td>5</td>
<td>3</td>
<td>Prac.</td>
<td>Industrial panel wiring</td>
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<tr>
<td>6</td>
<td>3</td>
<td>Prac.</td>
<td>Systematic fault finding</td>
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<tr>
<td>7</td>
<td>4</td>
<td>Theo.</td>
<td>DC-motors and generators</td>
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<tr>
<td>8</td>
<td>5</td>
<td>Theo.</td>
<td>Generator units</td>
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<td>9</td>
<td>4</td>
<td>Lab.</td>
<td>Control circuits cum pneumatic</td>
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<td>10</td>
<td>5</td>
<td>Prac.</td>
<td>Generator units</td>
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<tr>
<td>11</td>
<td>6</td>
<td>Theo.</td>
<td>Electronics I</td>
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<tr>
<td>12</td>
<td>6</td>
<td>Lab.</td>
<td>Components, basic circuits/measurements</td>
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<tr>
<td>13</td>
<td>7</td>
<td>Theo.</td>
<td>Electronics II</td>
<td></td>
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<tr>
<td>14</td>
<td>7</td>
<td>Lab.</td>
<td>Advanced circuits/measurements, project</td>
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<tr>
<td>15</td>
<td>8</td>
<td>Theo.</td>
<td>Illumination</td>
<td></td>
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<tr>
<td>16</td>
<td>Prac.</td>
<td>Design and manufacturing of projects, involving mechanical, electrical, and electronics related skills and knowledge;</td>
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<tr>
<td>17</td>
<td>Prac.</td>
<td>Testing and commissioning of the projects</td>
<td></td>
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<td>21</td>
<td>Theo.</td>
<td>Trade Test Grade II</td>
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</tbody>
</table>

Flow of Training, 2nd Year

Table VII/6
Teaching Objectives

As discussed earlier, the full sets of objectives for the courses are not given in this paper, although they have been prepared, together with the instructors, when selecting the content/topics for the courses. At least one example is given, to show the direction of curriculum development, in which the committee of the National Development Institute could proceed. For the formulation of objectives the widely accepted "Bloom's Taxonomy"1) was chosen.

..... Bloom's taxonomy continues to be of much interest for the teacher in further education since its influence may be perceived in areas as syllabus and examination-paper construction, objective tests, schemes of marking and evaluation, and the identification of training needs in industry and commerce. 2)

Objectives for Unit 1: 3-ph. Motors (Theory)
Institutional Training
Intermediate Level

The pre-requisite for this course is the successful participation in the first year of training (basic level), or an equivalent level of knowledge. The course duration is approx. 40 periods (one week), and a lab. with machines and measuring equipment is additionally available. Since the trainees have done the first year already, new objectives of the phychomotor domain are not involved.

Objectives of the cognitive domain:
The trainee should be able to ...

Squirrel cage motor

1.01 - describe the basic construction/principle of a squirrel cage motor.

1.02 - describe the different types of squirrel-cage motors.

1.03 - read the name plates and select the correct motor according to the needs.

Motor protection

1.04 - describe the function and importance of the motor protection.

1.05 - distinguish between over-current release and short-circuit release.

1.06 - identify the motor protection components in circuit drawings.

1.07 - select the correct circuit breaker and set it according to the motor data.

1.08 - set up a motor circuit and trip the over-current release by overloading.

Name plate

1.09 - distinguish between cos-phi and \( \eta \).

1.10 - calculate \( \eta \) from the given data.

1.11 - explain which of the values on the name plate change with the load.

1.12 - identify the different motors according to the given name plates.

Wiring diagram

1.13 - explain the advantage of a wiring diagram against a current flow diagram.

1.14 - draw the external wiring and indicate the corresponding terminals.

1.15 - complete a wiring diagram according to a given current flow diagram.

Starting methods

1.16 - distinguish between the stator- and rotor methods to start an induction motor.

1.17 - identify the stator methods as a reduction of the stator voltage.

1.18 - identify the rotor method as an increase of the rotor resistance.

1.19 - name the different stator and rotor methods.

Star-Delta starting circuit

1.20 - identify the Y-Delta starting circuit as the most common starting method.

1.21 - select the correct motor for the Y-Delta circuit according to the name plate.

1.22 - calculate the current and power ratios.

1.23 - identify the Y-Delta components in a given circuit and add missing connections.

1.24 - develop the current flow diagram for a given main circuit (Y-Delta connection).

1.25 - set up the circuit with a Y-Delta switch and measure the voltage at the windings.

1.26 - measure the current and power relation in a Y-Delta circuit under load.
1.27 - set up and run a Y-Delta contactor circuit with and without time relay.

Slip-ring motor

1.28 - identify the slip-ring motor as a common way to achieve a heavy load starting.

1.29 - identify the specific components in a circuit diagram.

1.30 - set-up and run the circuit of a slip-ring motor with starting resistance.

1.31 - measure the currents and voltages at a slip-ring motor under load.

1.32 - calculate the changing slip of the motor.

1.33 - calculate the current rating of a starting resistor.

Motor characteristics

1.34 - identify the characteristic diagrams of different motors.

1.35 - interpret the most common diagrams.

1.36 - explain the importance of the motor characteristics for the selection of motors.

2-speed motor

1.37 - explain the relation between the number of poles and the rpm.

1.38 - distinguish between separate windings and the consequent-pole connection for different speeds.

1.39 - calculate the rpm from the number of poles and state common relations between the two speeds.

1.40 - identify the specific components in a 2-speed circuit.

1.41 - complete the connections in a 2-speed circuit with a switch.

1.42 - develop the current flow diagram for a given main circuit (2-speed contactor).

1.43 - set-up and run switch/contactor operated circuits and measure the rpm.

From the "Affective Domain", there is one objective which has to be aimed at constantly: "The trainee should be willing to use and apply the protective systems to protect lives and health, and save materials". 
CHAPTER VIII

SUMMARY AND CONCLUSIONS

Balochistan, a rural province in Pakistan with little infrastructure and industry, but a high illiteracy rate, has tried to initiate industrial development, in order to create work places for the increasing number of unemployed youngsters. After the first attempt in Uthal, a town at the R.C.D. Highway Karachi-Quetta (approx. 150 km from Karachi), had failed due to lack of infrastructure and skilled manpower, the second attempt was started in Hub Chowki in 1978 with the aim of 800 industrial units for the year 1990. To avoid a second failure, a Technical Training Centre was planned to provide skilled Balochistani manpower for the industries, serving them as well as the unemployed youngsters. Nearby Karachi should make up for any lacking infrastructure until it would have been developed. Assistance for the T.T.C. was sought from the Fedr. Republic of Germany and granted after a preliminary study, more so because the "political climate" was favourable for such an assistance to Balochistan — a province seriously affected by the war in Afghanistan.

... General Rahimuddin decided to cash in. He suggested a special development programme for the area, financed by the foreigners. ... According to the chief secretary of Baluchistan, Mr. Poonegar, $5 billion worth of aid — $1,000 each for everybody living in Baluchistan — had been committed by the foreigners by the end of 1987. The rush was so great that the World Bank committed $40 million to one project without the details. 1)

The pace of development of the industrial area was much slower than expected, but the Technical Training Centre was still planned according to the original, high estimates. Lack of statistical monitoring from either side, the Balochistani and the German, left the facts undetected and unattended until 1987, when a complete census was undertaken. At that time, all preparations (installation of machines, recruitment of advisers, etc.) had been made for a start according to the original plan of operation, too late to adapt them to the prevailing situation.

The training could not commence in April 1987, as planned, due to a political battle over the important question: T.T.C. Hub Chowki for Balochistanis only, or not? At that time this question was answered by the late Chief Minister of Balochistan, Al Haj Mir Jam Ghulam Qadir Khan of Lasbela, in favour of Balochistani youngsters. This is a consequent and logical decision when observing the reason for setting up the industrial estate: Provision of work places to the local people of Balochistan.

having the people of Balochistan in mind. On the one hand, by providing instructor posts to the locals, these have a chance of a regular income and improving their teaching experience. On the other hand, the daily involvement in the teaching, without proper knowledge about the subject matter, deprives them of their chance to become competent instructors through long-term instructor training, starting with technical subjects, first. Only competent instructors can be valuable for the people of the province. A solution could be the employment of instructors from Karachi and other provinces on contract basis, while the local instructors are on training, what would even give a chance to young, competent people in Karachi, many of whom are out of work. These thoughts and suggestions leave out the task of nation building, which is not yet fully accomplished in Pakistan, and cannot be tackled by the writer, though the proposed "province building" would be the first step in the right direction.

A comment on aid projects by the Director General of the UNESCO done in 1971 may serve as an after-thought to the foregoing chapters:

...., since it should be borne in mind that we were carrying out projects which have frequently been devised five or six years ago, or even earlier. Doubtless to begin with we were often much too optimistic. We overestimated the capacities of the countries, we did not always study their needs in a sufficiently specific manner, and our projects conceived by specialists in too abstract a fashion, did not altogether fit into the general context of each national situation. 1)

Before preparing the courses and training software, the existing national occupational skill standards and curricula were checked and compared to the requirements of the industries and trainees. The National Training Board NTB had published a trade standard as well as a curriculum for electricians in 1986, but these were not up to the required standard for maintenance electricians, working in modern industries. Therefore, the writer proposed a new national occupational skill standard to the NTB, and thanks to the very good co-operation of the persons and institutions concerned, a new skill standard was published in 1987 for the trade:

Maintenance Electrician (Industries)

After the training finally had started, the implementation of the first year was no problem, because equipment and training software were well prepared. The problem started with the introduction of the apprenticeship part of the training: Industries were either not willing or competent to fulfil their part of the

1) Phillips H.M., Educational cooperation between developed and developing countries, New York: Praeger Publ., 1976, p. 4
dual training, and the Directorate Labour-Manpower did not supply the apprenticeship officer. The trainees left their training places, breaking their contract, either because the situation was unsatisfactory, or the training period was too long for them. This situation was resolved by a change of the scheme, leaving a more promising result now. The apprenticeship officer is not yet appointed, although two posts are financed under the Second Vocational Training Project (World Bank). The missing apprenticeship officer, and hence, the lacking relations to the industries, could be one cause for the failure of the training scheme.

Recommendation for the Second Project Period (1990 – 93)

The first project period ends in July 1990, covering the setting-up and the first implementation phase of the project. This period was accompanied by six German advisers. The second phase has to run on a smaller financial base from the side of the German agency, working on behalf of the German government. To make ends meet, the advisory team has to be reduced considerably. This reduction of the number of advisers is not too serious, because foreign advice alone, cannot solve the problems, elaborated on in the preceding chapters. Sufficient funds (better, one adviser less, than too small funds) are needed to support the project on its recurrent costs, but the main task will be the instructors’ training. All out efforts are necessary for solving this problem, utilizing, first of all, the local possibilities (local industries, private institutions in Karachi, courses run by Pakistani experts in the T.T.C.), but also, courses in neighbouring countries (English medium). For example, instructors could be sent to Singapore for training in the fields of electronics, hydraulics, and pneumatics, courses which are offered there at a high standard of technology and instruction. This approach would be more economical than sending the instructors to Germany for further training, and would simultaneously improve their ability to utilize the technical literature available in the country in the English language. This approach could serve as an interim solution to overcome the shortage of competent instructors (refer to Chapter II), until the NSTI in Islamabad is in full operation. In order to set the local instructors free for the training, contract instructors have to be employed, if necessary with the financial aid of the German agency. A possible “deal” it could be: one contract instructor paid through German funds against one local instructor, paid by the Government of Balochistan and set free for training.

The next crucial point is the co-operation with the industries and their active involvement in the training of the apprentices. Working has to come to a level of trust and bilateral interest rather than of pressure and forced participation based on rules and regulations. Without the active involvement of the industries the project has to be questioned. With institutional training only, the project should be close to the people, not in an industrial estate without its involvement in the dual training. According to the writer’s experience, this involvement can
be reached with cooperation and perseverance, shown by the partners of the dual training scheme.

A list of tasks to be approached, and problems to be solved might be helpful for those persons, who will plan and guide the second project period:

Selection of Instructors

- Considering the political situation, select locals only.
- No compromises should be made on the requirements for a good general education.
- Consider pass-outs of the T.T.C. as future instructors.

Instructors' Training

- Set free as many instructors as possible for the training, by adjusting the intake of trainees to the T.T.C. to the instructor situation, rather than to the planned training capacity.
- Employ instructors from outside Balochistan on contract, to set the local instructors free for training.
- Offer general subjects (e.g. Mathematics, English) after classes in Hub Chowki (teachers from high schools).
- Offer technical subjects after classes in Hub Chowki (engineers from the industries as teachers).
- Send every instructor for in-plant training to modern factories in Hub and/or Karachi.
- Send instructors for training to private institutes in Karachi.
- Send instructors for training abroad, preferably English speaking countries in Asia.
- Send all instructors to the Staff Training Institutes in Lahore and/or Islamabad.
- Arrange, that promotion is not only done according to seniority, but to performance, and participation in the instructors' training.

Recruitment and Selection of Trainees

- Do every effort to fill the training places with Baluchistanis.
- Permit applicants with middle pass to join the training.
- Perform public relation campaigns regularly.
- Conduct entrance tests, in order to find out those applications, where certificates and performance differ too widely.

In-plant Training

- Post at least one apprenticeship officer at Hub Chowki.
- Persuade the industries to appoint a "training in-charge" in each factory.
- Organize seminars with the "training in-charges".
- Support the "training in-charges" to prepare training rosters for the different trades in "their" factories.

Recurrent Costs

- Support the Directorate Labour Manpower by sharing the recurrent costs at a decreasing proportion over the the time.
- Evaluate all the training activities on their recurrent costs.

Improvement of Living Conditions for Instructors/Trainees

- Provide housing, adequate for instructors with families.
- Set incentives for instructors who bring their families.
- Provide regular transport to the market and schools.
- Promote community activities.
- Appoint a competent hostel warden, willing and able to bring active life to the hostel after classus.
- Promote the "private" use of certain workshop facilities by common groups of instructors and trainees, after classes.

As long as these points have not been fully covered, the project should refrain from starting new trades and even from the introduction of a course opening the craftsman training towards further education. This is a stringent requirement as long as the other problems are not solved, although this opening is very much desirable. In addition, a too early start would harm the craftsman training, as well as the new course itself.

Despite all the problems, it is the writer's finding, that the Technical Training Centre Hub Chowki in co-operation with the industries of the area, is one feasible way of providing skilled local manpower to the industries and to overcome the unemployment of the youngsters in the province.
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Electrician Grade III. Islamabad: 1986
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cational Training Project Phase II, PC-I. Islamabad: 1986
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tan, National Occupational Skill Standard for Maintenance 
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Jang Quetta: October 13th, 1988
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National Training Board-Government of Pakistan, Curriculum Electrician Grade III. Islamabad: 1986
National Training Bureau-Government of Pakistan, National Vocational Training Project Phase II, PC-I. Islamabad: 1986
Pergamon Journals 1986, Cultural Differences in Teaching and Learning
World Bank, Report on Second Vocational Training Project. 1986
CURRICULUM VITAE

Civil Status

Born on May 25th 1942 in Wilhelmshaven, Germany

Nationality: German

Married, with two grown sons

Educational Attainment

1948 - 1961 Primary and Secondary Education

1962 - 1965 College of Engineering, Osnabrück
   - B.Eng. Electrical

1968 - 1970 Teacher's training (vocational education)

1971 London - five months English language training
   - Cambridge Certificate of Proficiency

1971 - 1973 Philippine Wesleyan College - M.A. Education

   (equivalent M.Phil.)

1988 - 1990 Karachi University - Ph.D. course

Professional Attainment

1959 - 1961 Trade Training - Electrician

1965 - 1968 Electrical Engineer (power supply company)

1968 - 1971 Instructor - Electrical (community college, Friesoythe)

1971 - 1973 Head of Electronics Department - Philippine Wesleyan College, Philippines

1975 - 1978 Instructor - Electrical (community college, Lingen)

1978 - 1980 Head of Electrical Department - Arusha Technical College, Tanzania

1980 - 1986 Senior Instructor - Electrical (community college, Lingen)

1986 - 1990 Dy. Project Manager/Adviser - Pak-German T.T.C.
   Hub Chowki, Pakistan

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APPENDIX

II/1 Questionnaire: Institutes in Balochistan
II/2 Map of Balochistan
IV/1 List of companies visited
IV/2 Information about project
IV/3 Questionnaire: Census of Industries
IV/4 Announcement poster
IV/5 Translation of the poster
IV/6 Letter of the Directorate Labour-Manpower
V/1 Letter to the companies (10-2-88)
V/2 Questionnaire: Apprenticeship Training
V/3 List of companies for the distribution of the questionnaires
VI/1 Information leaflet
VI/2 Placement of trainees (letter 17-5-89)
VI/3 Open days (letter 25-5-89)
VII/1 National Occupational Skill Standard for Maintenance Electrician (Industries)
<table>
<thead>
<tr>
<th><strong>Name of Institute:</strong></th>
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<tr>
<th><strong>Location/Address:</strong></th>
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<tr>
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<th><strong>Field of Teaching/ Instruction:</strong></th>
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</table>

<table>
<thead>
<tr>
<th><strong>Number of Students/ Trainees:</strong></th>
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</thead>
<tbody>
<tr>
<td>(according to year, field, trade, etc.)</td>
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<td></td>
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</table>

<table>
<thead>
<tr>
<th><strong>Number of Graduates:</strong></th>
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</thead>
<tbody>
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<td>(according to year, field, trade, etc.)</td>
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<td></td>
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</tbody>
</table>

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<thead>
<tr>
<th><strong>Number of Teachers/ Instructors:</strong></th>
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<td>(according to subject/ field)</td>
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<table>
<thead>
<tr>
<th><strong>Teaching Materials, Labs, Machines:</strong></th>
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<th><strong>Remarks:</strong></th>
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<th><strong>Date of Visit:</strong></th>
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</tr>
<tr>
<td></td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
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<tr>
<td>3</td>
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<tr>
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<td>6</td>
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<td>7</td>
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<td>8</td>
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<tr>
<td>10</td>
</tr>
<tr>
<td>11</td>
</tr>
<tr>
<td>12</td>
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</tbody>
</table>

**Plastic Industries:**

<table>
<thead>
<tr>
<th>No.</th>
<th>Company</th>
<th>No. of Em</th>
<th>No. of un</th>
<th>Typical Product</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>employees</td>
<td>skill. Lab.</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Fauji Polypropylene Products</td>
<td>289</td>
<td>177</td>
<td>Plastic bags</td>
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<tr>
<td>14</td>
<td>Pak-Poly Ltd.</td>
<td>120</td>
<td>65</td>
<td>Plastic glass</td>
</tr>
<tr>
<td>15</td>
<td>ADIL Industr. Ltd.</td>
<td>11</td>
<td>3</td>
<td>under test</td>
</tr>
<tr>
<td>16</td>
<td>Prepac Pak. Ltd.</td>
<td>14</td>
<td>--</td>
<td>Plastic films</td>
</tr>
<tr>
<td>17</td>
<td>Balochistan Laminates</td>
<td>68</td>
<td>24</td>
<td>Laminat. sheets</td>
</tr>
<tr>
<td>18</td>
<td>Sohail Saleem</td>
<td>22</td>
<td>7</td>
<td>Suitcases</td>
</tr>
<tr>
<td>19</td>
<td>Synthetic Mats</td>
<td>29</td>
<td>5</td>
<td>Plastic bags</td>
</tr>
<tr>
<td>20</td>
<td>Mian Nazir Sons Ind.</td>
<td>94</td>
<td>43</td>
<td>Polypropy. bags</td>
</tr>
<tr>
<td>No.</td>
<td>Company</td>
<td>No. of Employees</td>
<td>No. of unskilled Employees</td>
<td>Typical Product</td>
</tr>
<tr>
<td>-----</td>
<td>----------------------------------------</td>
<td>------------------</td>
<td>----------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>21</td>
<td>Asian Industries Ltd.</td>
<td>32</td>
<td>4</td>
<td>Doors</td>
</tr>
<tr>
<td>22</td>
<td>Stramit Systems</td>
<td>37</td>
<td>3</td>
<td>Doors and boards</td>
</tr>
<tr>
<td>23</td>
<td>Forest Products</td>
<td>138</td>
<td>45</td>
<td>Furniture</td>
</tr>
<tr>
<td>24</td>
<td>Balochistan Particle Boards</td>
<td>93</td>
<td>30</td>
<td>Chip boards</td>
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</table>

**Food Industries:**

<table>
<thead>
<tr>
<th>No.</th>
<th>Company</th>
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<th>No. of unskilled Employees</th>
<th>Typical Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>Habib Arkady Ltd.</td>
<td>216</td>
<td>50</td>
<td>Fructose syrup</td>
</tr>
<tr>
<td>26</td>
<td>Pure Foods Ltd.</td>
<td>92</td>
<td>46</td>
<td>Sweets, chocol.</td>
</tr>
<tr>
<td>27</td>
<td>Niazsons Ltd.</td>
<td>19</td>
<td>2</td>
<td>Potato chips</td>
</tr>
<tr>
<td>28</td>
<td>Ambrosia Intern. Ltd.</td>
<td>37</td>
<td>6</td>
<td>Juices, dairy p.</td>
</tr>
<tr>
<td>29</td>
<td>English Sweets Ltd.</td>
<td>60</td>
<td>44</td>
<td>Sweets</td>
</tr>
<tr>
<td>30</td>
<td>Bela Ghee Mill Ltd.</td>
<td>100</td>
<td>16</td>
<td>Ghee</td>
</tr>
<tr>
<td>31</td>
<td>National Fructose</td>
<td>125</td>
<td>18</td>
<td>Fructose syrup</td>
</tr>
<tr>
<td>32</td>
<td>Balochistan Oil Ltd.</td>
<td>10</td>
<td>5</td>
<td>Ghee</td>
</tr>
<tr>
<td>33</td>
<td>Bela Flour Mills</td>
<td>9</td>
<td>5</td>
<td>Wheat flour</td>
</tr>
<tr>
<td>34</td>
<td>Ajma Ghee Mill Ltd.</td>
<td>97</td>
<td>22</td>
<td>Ghee</td>
</tr>
<tr>
<td>35</td>
<td>GUM Intern. Ltd.</td>
<td>5</td>
<td>1</td>
<td>Guan protein m.</td>
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**Building Industry:**

<table>
<thead>
<tr>
<th>No.</th>
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<th>No. of unskilled Employees</th>
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<tbody>
<tr>
<td>36</td>
<td>Asphatar Ind. Ltd.</td>
<td>15</td>
<td>6</td>
<td>Asphalt</td>
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<tr>
<td>37</td>
<td>Attock Cement Pak.</td>
<td>370</td>
<td>50</td>
<td>Cement</td>
</tr>
<tr>
<td>38</td>
<td>Mehran Industries</td>
<td>9</td>
<td>3</td>
<td>Concrete elemen.</td>
</tr>
<tr>
<td>39</td>
<td>Baloch. Clay Prod.</td>
<td>38</td>
<td>6</td>
<td>Bricks</td>
</tr>
<tr>
<td>40</td>
<td>Balochistan Concrete &amp; Blocks Ltd.</td>
<td>8</td>
<td>3</td>
<td>Prestressed ele.</td>
</tr>
<tr>
<td>No.</td>
<td>Company</td>
<td>No. of Employees</td>
<td>No. of_unskil. Lab.</td>
<td>Typical Product</td>
</tr>
<tr>
<td>-----</td>
<td>----------------------------------------------</td>
<td>------------------</td>
<td>---------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>41</td>
<td>Polyron Ltd.</td>
<td>215</td>
<td>28</td>
<td>Polyester yarn</td>
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<tr>
<td>42</td>
<td>Baloch. Ind. Gases</td>
<td>59</td>
<td>35</td>
<td>Oxygen</td>
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<tr>
<td>43</td>
<td>Bela Chem. Ind./Winder</td>
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<td>Chemicals</td>
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<td>Minchem Ltd.</td>
<td>133</td>
<td>49</td>
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<td>Mideast Oil &amp; Grease Corporation Ltd.</td>
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<td>17</td>
<td>Lubricants</td>
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<tr>
<td>46</td>
<td>Dyno Pakistan Ltd.</td>
<td>97</td>
<td>18</td>
<td>Formaldehyde</td>
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<tr>
<td>47</td>
<td>Pakistan Medical</td>
<td>4</td>
<td>2</td>
<td>Gases</td>
</tr>
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<td>48</td>
<td>Pakistan Formica</td>
<td>33</td>
<td>4</td>
<td>Laminated sheet</td>
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<td>Pak. Oxygen/Gadani</td>
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<td>Hydari Gas Ltd.</td>
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<td>Rahmat Dyes Ind.</td>
<td>22</td>
<td>4</td>
<td>Colours, dyes</td>
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<tr>
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<td>Allied Chem. Industr.</td>
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<td>1</td>
<td>Soap</td>
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<tr>
<td>53</td>
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<td>13</td>
<td>Oxygen</td>
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<tr>
<td>54</td>
<td>Gatron Ind. Ltd.</td>
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<td>55</td>
<td>Baloch. Lubricant Blenders Ltd.</td>
<td>18</td>
<td>14</td>
<td>Lubricants, oil</td>
</tr>
<tr>
<td>56</td>
<td>Degesch Pak. Ltd.</td>
<td>11</td>
<td>3</td>
<td>Fumigation tabl.</td>
</tr>
<tr>
<td>57</td>
<td>GEM Industries Ltd.</td>
<td>8</td>
<td>4</td>
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**Light Industries:**

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<thead>
<tr>
<th>No.</th>
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<tr>
<td>58</td>
<td>Sun Beam Industries</td>
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<td>Metaplast Ltd.</td>
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<td>Print-Pack Ltd.</td>
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<td>25</td>
<td>Packing mater.</td>
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<td>Intern. Container Co.</td>
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<td>13</td>
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<td>62</td>
<td>Filtrona Pak. Ltd.</td>
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<td>Cigar. filters</td>
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<td>Mukarram Ind. Ltd.</td>
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</tr>
<tr>
<td>-----</td>
<td>-----------------------</td>
<td>------------------</td>
<td>--------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>64</td>
<td>Pawel Sales Ltd.</td>
<td>23</td>
<td>16</td>
<td>Welding rods</td>
</tr>
<tr>
<td>65</td>
<td>Arabian Gulf Welding</td>
<td>30</td>
<td>13</td>
<td>Welding rods</td>
</tr>
<tr>
<td>66</td>
<td>Pak. Paper Sacks</td>
<td>37</td>
<td>20</td>
<td>Paper sacks</td>
</tr>
<tr>
<td>67</td>
<td>Fauji Metalized Paper</td>
<td>31</td>
<td>7</td>
<td>Metalized paper</td>
</tr>
<tr>
<td>68</td>
<td>Minerva Ind. Ltd.</td>
<td>5</td>
<td>1</td>
<td>Water meter</td>
</tr>
<tr>
<td>69</td>
<td>Paksaco Ltd.</td>
<td>68</td>
<td>32</td>
<td>Paper sacks</td>
</tr>
<tr>
<td>70</td>
<td>Wastani Engineering</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Electronics/Electrical Industry:**

<table>
<thead>
<tr>
<th>No.</th>
<th>Company</th>
<th>No. of Employees</th>
<th>Unskil. Lab.</th>
<th>Typical Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>71</td>
<td>Kyoto Capital Goods</td>
<td>76</td>
<td>10</td>
<td>Radio recorder</td>
</tr>
<tr>
<td>72</td>
<td>Sayn Industries Ltd.</td>
<td>19</td>
<td>3</td>
<td>Copper wire</td>
</tr>
<tr>
<td>73</td>
<td>Auvitronics Ltd.</td>
<td>200</td>
<td>20</td>
<td>Cassettes</td>
</tr>
<tr>
<td>74</td>
<td>Allied Industries</td>
<td>33</td>
<td>7</td>
<td>Copper wire</td>
</tr>
<tr>
<td>75</td>
<td>Pak. Telephone Cables</td>
<td>70</td>
<td>8</td>
<td>Teleph. cable</td>
</tr>
<tr>
<td>76</td>
<td>Pioneer Cables Ltd.</td>
<td>154</td>
<td>10</td>
<td>Power cables</td>
</tr>
</tbody>
</table>

**Textile Industry:**

<table>
<thead>
<tr>
<th>No.</th>
<th>Company</th>
<th>No. of Employees</th>
<th>Unskil. Lab.</th>
<th>Typical Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>77</td>
<td>Siddiq &amp; Sons Ltd.</td>
<td>160</td>
<td>30</td>
<td>Cotton yarn</td>
</tr>
<tr>
<td>78</td>
<td>Latif Jute Mills</td>
<td>551</td>
<td>200</td>
<td>Jute bags/twine</td>
</tr>
<tr>
<td>79</td>
<td>Lasbeia Textile Mills/Ut</td>
<td>2400</td>
<td>185</td>
<td>Textile products</td>
</tr>
<tr>
<td>80</td>
<td>Pak Fibre Industries</td>
<td>110</td>
<td>5</td>
<td>Fibre yarns</td>
</tr>
<tr>
<td>81</td>
<td>Malik Textile Ind.</td>
<td>90</td>
<td>28</td>
<td>Cotton yarn</td>
</tr>
<tr>
<td>82</td>
<td>Al-Shafi Industries</td>
<td>30</td>
<td>2</td>
<td>Knit ware</td>
</tr>
<tr>
<td>83</td>
<td>Feroze Textile Mills</td>
<td>63</td>
<td>14</td>
<td>Cotton yarn</td>
</tr>
<tr>
<td>84</td>
<td>N.P. Waterproof Textile Mills</td>
<td>103</td>
<td>45</td>
<td>Cotton yarn</td>
</tr>
<tr>
<td>85</td>
<td>N.N. Textile Mills</td>
<td>100</td>
<td>50</td>
<td>Cotton yarn</td>
</tr>
<tr>
<td>86</td>
<td>Balochistan Glass</td>
<td>289</td>
<td>120</td>
<td>Glass container</td>
</tr>
</tbody>
</table>
January 1987

Dear Sirs,

We would like to request your assistance in our efforts towards a good training at the T.T.C. Hub Chowki. All the answers and information received will stay confidential and will only be used in the context of this study.

Sincerely yours,

Mr. H. Wolter
Liaison Officer

Mr. H.E. Vallon
Project Manager

Attached:
1 information leaflet
1 set of questionnaires
Within the long co-operation between the Governments of the Islamic Republic of Pakistan and the Federal Republic of Germany, the technical training has always played an important role. This is true for all the different provinces, including the Balochistan Province. One of the latest projects is the Pak-German T.T.C. in Hub Chowki.

Aim of the Project:

The Government of Balochistan, with the assistance of the Federal Government, has initiated an industrial zone in Hub Chowki, in order to attract industries to this province. This should lead to a rise of the standard of living of the people. Those industries have a high demand for semi-skilled and skilled workers. To answer this demand and to provide better employment prospects to the young men of the province, the two governments have agreed to establish a technical training centre within the industrial zone.

Concept of the Project:

From various studies conducted in the past it was concluded, that the main demand would be for semi-skilled workers-Grade III, and skilled workers-Grade II (metal trades and electricians). The training will be in accordance with the Trade Standards set out by the National Training Bureau. The practical/theoretical ratio will be approx. 80% : 20 %. Adoption to the requirements of the industries will be imperative. To reach this, it is planned to establish an advisory committee. Furthermore, a study will be conducted to receive advice from the various industries with respect to their special needs. The results will be included into the training scheme. A second aim of this close relation to the industries is the effort to establish a co-operative system of technical training (apprenticeship training). This system will increase the number of trainees tremendously.

The age range of the trainees will be 16 - 22 years. The minimum qualification for admission is the completion of the 8th class (middle pass), but preferable it should be the 10th class (matric). The training will commence on April 1st, 1987.
Organization of the Training:

a) Distribution of the trainees to the various trades

<table>
<thead>
<tr>
<th>Year of Training</th>
<th>Trades</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Millwright</td>
<td>Maintenance</td>
</tr>
<tr>
<td>I Year 1 Batch</td>
<td>24</td>
<td>16</td>
</tr>
<tr>
<td>I Year 2 Batch</td>
<td>24</td>
<td>16</td>
</tr>
<tr>
<td>II Year 1 Batch</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>II Year 2 Batch</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>64</td>
<td>40</td>
</tr>
</tbody>
</table>

b) Progress of the trainees through the different stages of the training

- **I. Year (Full-time)**
  - 6 months Basic Training
  - 6 months Technical Training
  - 6 months Basic Training (Demos Work)
  - 60 Trainees

- **II. Year (Part-time)**
  - 24 months Advanced Institutional Training

- **III. Year (Part-time)**
  - 16 months Apprenticeship Training
  - According to the Apprenticeship Training Ordinance
  - Approx. 60 Trainees

Annotations:
- Passouts: Skilled Workers
- Passouts: Semi-skilled Workers
  - Approx. 60 Trainees
1. Name of undertaking

2. Name and position of the interviewed partner

3. Location of the undertaking | 3 a) Address of Head Office

Tel.: | Tel.: 

4. Field of production/services

5. □ Governmental □ Semi-Governmental □ Private

6. Typical products/services

7. Number of employees

<table>
<thead>
<tr>
<th></th>
<th>at present</th>
<th>development for the future</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>steady</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technicians</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skilled workers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semi-skilled workers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labourers</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
8. **Educational and vocational background of the workers**

<table>
<thead>
<tr>
<th>General Education</th>
<th>Millwright Fitter</th>
<th>Maintenance Mechanic</th>
<th>Machinist</th>
<th>Maintenance Electrician</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total No.</td>
<td>skill.</td>
<td>semi-skill.</td>
<td>skill.</td>
<td>semi-skill.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower Middle</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Middle Pass</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Matric</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vocational Training</td>
<td>on-the-job training</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 year-Inst.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 years-Inst.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 years-Inst.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>others</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9. **What is the initial payment for the workers in your company?**

**What is the average increase per year?**

<table>
<thead>
<tr>
<th>Background</th>
<th>Initial payment</th>
<th>average increment per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-the-job-training</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 year-Institution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 years-Institution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 years-Institution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>others</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
10. Would you be willing to take trainees during their 2nd and 3rd year for their apprenticeship training (one day per week in the T.T.C.) leading to Grade II?

<table>
<thead>
<tr>
<th>Trade</th>
<th>No</th>
<th>Yes</th>
<th>If yes: Nos.</th>
<th>Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Millwright</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fitter</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machinist</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrician</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please refer to page 3 of the attached information paper!

11. What would be the criteria for the recruitment of a trainee for further training leading to grade II?

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Important</th>
<th>Medium</th>
<th>Less Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grades achieved in the test for grade III</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal interview / test</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selection through the worker's ass./trade union</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relative of an employee in the company</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This refers to question No. 10
12. Do you have trainees in your company at present?

<table>
<thead>
<tr>
<th>Trade</th>
<th>Yes</th>
<th>No</th>
<th>If no, why?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Millwright Fitter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance Mechanic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machinist</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance Electrician</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

13. Do you follow the rules and regulations as set by the N.T.B. (National Training Board) or set by other authorities?

☐ yes  ☐ no

14. Do you offer up-grading courses for the workers?

☐ yes  ☐ no

If no, why?

How is the up-grading organized?

☐ evening classes  ☐ during working hours

☐ regular  ☐ regular

☐ sporadic  ☐ sporadic
15. Do you have persons, qualified to guide and supervise the trainees?

<table>
<thead>
<tr>
<th>Trade</th>
<th>Qualifications</th>
</tr>
</thead>
</table>

16. Could you name certain skills, which are to be included in the training at T.T.C. Hub Chowki?

<table>
<thead>
<tr>
<th>Trade</th>
<th>Skills</th>
</tr>
</thead>
</table>

17. Do you suggest any further trade to be included in the T.T.C.? (for future planning)
18. Would you be willing to give another interview in order to elaborate more deeply on various skills for the different trades to be included in the T.T.C. curriculum?

☐ yes    ☐ no

If yes, who should be contacted?

Thanks a lot for your co-operation!
Department of Labour and Manpower  
Government of Baluchistan  

Admission Notice

Learn a technical trade and become a technician at the Pak-German Technical Training Centre, Hub Chowki.

We invite your application for the following trades:
1. Millwright Fitter course duration 2 years
2. Machinist course duration 2 years
3. Maintenance Mechanic course duration 2 years
4. Maintenance Electrician course duration 2 years

Required education: The minimum is middle pass, but matric is preferred.

Admission forms are available from the principal of the Pak-German T.T.C. Hub Chowki, from the Dy. Director Labour Welfare and the Ass. Commissioner in Hub Chowki during office hours.

Last date to submit the forms is February 15th, 1987 (Sunday) and the test will be on March 2nd, 1987 (Monday) at the principal's office of the Pak-German T.T.C. in Hub Chowki.

The results will be released on March 16th, 1987 (Monday) and classes will start from 1st April, 1987.

Scholarship: Selected trainees will receive 200 Rupees per month.

Note: Trainees, who are not from Hub Chowki, will get hostel facilities.

Extra information are available at the principal's office.

The principal, Pak-German Technical Training Centre, Hub Chowki
Las Belas District
German Agency for Technical Cooperation
Att.: Mr. J. Marz  FB 221
P.O. BOX 5180
D-6236 Eschborn 1
Fed. Rep. of Germany

Subject: Ratio of training places at the Pak-German T.T.C. Hub Chowki.

Dear Sir,

According to the result of the survey conducted by the P.G. T.T.C. in collaboration with the Directorate of Labour and Manpower it can be assumed, that the demand for Millwright Fitters will be less than the training capacity of the T.T.C. On the other hand there is a high demand for Maintenance Mechanics.

It is therefore recommended to react to this result by shifting training places from the Millwright Fitters to the Maintenance Mechanics according to the actual requirement. Of course, the total training capacity should not be lowered by this change.

[Signature]

Mohsin Baluch
Director Labour & Manpower
Baluchistan, Quetta
To the
Managers of the
Industries at H.I.T.E.
Hub Chowki

Sirs,

during our survey in Febr. 1987 you showed an interest in our vocational training scheme, which will follow after the first year of full-time training at the T.T.C.

Beginning of June 1988 the first batch will finish their first year and take the Trade Test Grade III (semi-skilled worker). After this we want them to find a place in a factory, where they can continue their training. During this 2nd and 3rd year the trainees will attend classes at our T.T.C. on release basis. Half of the time will be allocated to theoretical learning and the other half to skill up-grading. After the third year the trainees will take the Trade Test Grade II (skilled worker).

After we will have found the actual number of trainees required by the industries, we will provide a list to you, stating the facts about the applicants. You may invite them for an interview.

May we ask you to fill in the attached form. This will help us to plan and organize our training.

Thanks a lot for your kind co-operation.

PAK - GERMAN
Technical Training Centre
HUB CHOWKI
Near Fauji Foundation
Phone: (21947) 241 & 245

Principal, T.T.C. Hub Chowki
W. Wolfr, Liaison Officer

Attached: Questionnaire: Apprenticeship Training
Appendix V/2

Questionnaire: Apprenticeship Training

Name of company: ________________________________
Tel. (Hub): _________________________________

Person to contact:
Name, designation ________________________________

1. If you intend to take apprentices after their first year of training for their 2nd and 3rd year, please state the number required:

   Maintenance Electrician: [ ]
   Maintenance Mechanic: [ ]
   Machinist: [ ]

2. If you do not take an apprentice this year, will you be interested to be approached within one year again?

   Yes [ ] No [ ] (tick mark)

3. The start of the apprenticeship training is planned for July 1988, please state, if you have any suggestion concerning the date of start:

4. Do you prefer a day release system, [ ]
   a block system with 2 week blocks, [ ] (tick mark)
   a block system with longer blocks? [ ]

5. Besides the above information we would like to know, if you have adopted measures for the implementation of an Apprenticeship Scheme under the Apprenticeship Ordinance in your company already.

   Yes [ ] No [ ] (tick mark)

6. Any other remarks concerning the apprenticeship training:

   ____________________________________________________________
   ____________________________________________________________

Thanks a lot! (10-2-88)
To the
Managers of

Hub Chowki

Subject: Placement of trainees in the industries for 6 month

Sirs,

As already stated in our letter of April 25th, 1989 (delivered by hand), our Batch 88 will take the Trade Test Grade II (semi-skilled worker) in the trades:

Maintenance Electrician
Maintenance Mechanic
Machinist

on June 8th, 1989.

After this test, they are supposed to proceed with their training towards Trade Test Grade II (skilled worker) for one more year.

This second year of training will be organized in such a way, that from July 1st (Saturday) to Dec. 28th, 1989 (Thursday) the trainees will work in the factories to gain industry oriented on-the-job training by working in their field, together with skilled workers and foremen.

From Jan. 90 to June 90 the trainees will go back to the Pak-German T.T.C. for further practical/theoretical training, ending with the Trade Test Grade II (skilled worker). After that they are free for employment.

While complying with the governmental rules and regulations (section (h) of the factory NOC), we expect to receive your cooperation in such a way, that we can achieve improved performance and better results in future.
To the Manager/Training-in-charge

Hub Chowki

May 25th, 89

Subject: "Open days" at the T.T.C. on 21st/22nd May, 89

Sirs,

To place the Batch 88 to the industries (Trade Test III on June 8th, 89), the following steps were undertaken:

- On April 25th, 89 invitations were sent by messenger to 17 companies for the "open days".
- On May 17th/18th/20th Mr. Jaweed Iqbal (Principal) together with Mr. Beck/Mr. Wolter visited 17 companies to explain the training scheme and to invite for the "open days". All persons approached, promised to come to the T.T.C. for a visit.
- 5 more companies were invited by telephone/messenger.

Result: On the "open days" 2 groups (Attock Cement and Polymere & Prec. Engr.) paid their visit and promised to take some trainees.

The "open days" can be considered as a complete failure and we have to assume, that the industries are not willing to play their role in the training of Baluchistanis as required by the Government of Baluchistan (Section (h) of the NOC). In case you are still interested in co-operating in the training scheme, we invite you to state the number of trainees required by you up to June 1st,89 positively.

Trades: Maintenance Electrician
        Maintenance Mechanic
        Machinist

The industrial part of the training will start on July 1st, 89 for 6 month.

Sincerely yours,

Jaweed Iqbal, Principal

HUB CHOWKI

PAK - GERMAN
Technical Training Centre

Fauji Foundation

Phone: (21947/24), & 248

W. Wolter, Dr. Project Manager

Copy: Directorate Labour Manpower, Quetta
        German Agency for Techn. Co-operation (GTZ), Eschborn
In particular we want to mention:

- During the industrial phase the trainees should be utilized according to their pre-qualification (semi-skilled worker), keeping in mind, that different tasks and proper guidance during this relatively short period will give a meaningful experience.

- The trainees shall not be utilized as helpers and sweepers, but work on actual tasks in their trades.

- Because the T.T.C. is interested in a long term co-operation, it would be advisable to nominate a "training-in-charge" within your factory, making communication easier.

- During the industrial training at your factory, the trainees will stay under your control and is obliged to follow your rules and regulations.

- The trainees are requested to write work reports and we suggest, that these should be signed by the "training-in-charge" weekly.

- The trainees should be provided with Rs 300. as a monthly "industrial allowance" and be permitted to use your transport facilities.

- The trainees should be permitted to come to the T.T.C. once a month for one day (first time on July 6th, 89) to collect their regular stipend.

- On those days they should be sent to the T.T.C. with their monthly progress report (incl. attendance), signed by the training-in-charge.

We are looking forward to establishing a fruitful co-operation between the T.T.C. and the industries, which will benefit the local people of Balochistan and the industries.

This programme has been approved by the Department of Labour and Manpower, Government of Balochistan, and will be repeated every half year.

Sincerely yours,

Iqbal Jaweed
Principal

PAK - GERMANY
Technical Training Centre
Hub Chowk
Near Fauji Foundation
Phone: (21947) 241 & 245

Dy. Project Manager
Government of Pakistan
(Manpower Division)
National Training Development Institute
39, Sector H-9
***************

No.5(11)SS-NTDI/88
Islamabad, the 12th September 1988

To:
Mr. Muhammad Inayat,
(Chairman, Technical Committee for Electrical Trades),
Associate Professor (Electrical),
National Technical Teachers Training College,
H-8, Islamabad

Subject: MINUTES OF MEETING AND REVISED NATIONAL OCCUPATIONAL SKILL STANDARD FOR MAINTENANCE ELECTRICIAN(INDUSTRIES)

Please find enclosed herewith the minutes of the meeting of the Technical Committee for Electrical Trades held on 31st August - 1st September 1988 at the National Training Development Institute (NTDI), Islamabad.

The revised National Occupational Skill Standard for Maintenance Electrician (Industries) incorporating the amendments agreed during the meeting is also appended.

Please acknowledge the receipt.

(NAZIR AHMED KHURSHID)
Secretary

cc.
Syed Birjees Asghar,
General Manager,
PECO, Lahore

Mr. W. Wolter,
Dy. Project Manager,
Pak-German TTC,
Hub Chowki

Mr. Aziz-ur-Rehman
Electrical Engineer
PETROMEN, Karachi
Mr. Muhammad Ayub,
Senior Instructor,
Swedish-Pakistani Institute of Technology,
Gujrat

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96, Gulberg, Lahore

Mr. Afzal Malik,
Joint Director,
ATC, Islamabad

Mr. A. Nachor,
ILO Consultant on D.S.S.
NTB, Islamabad

P.A. to The Director, NTOL
for information, please

(NAZIR AHMED KHURSHID)
Secretary
A meeting of the Technical Committee for Electrical Trades was held at the National Training Development Institute (NTOI), Islamabad on the 31st August - 1st September, 1988 to deliberate on the contents of the Draft National Occupational Skill Standard for Maintenance Electrician (Industries). The list of participants who attended the meeting is attached (Annex. A).

With the approval of the Chairman, the meeting commenced at 10:00 a.m. followed by the recitation from the Holy Quran.

Welcome address was delivered by Mr. Mehboob Hassan, Acting Director General, National Training Bureau.

The committee members were briefed by Mr. A. Nachor, ILO Consultant, regarding the concept and objectives of the National Occupational Skill Standard, Trade Testing and Certification Programme in Pakistan.

A short brief regarding the necessity for the preparation of the National Occupational Skill Standard for Maintenance Electrician(Industries) was given by Mr. Wolter of GTZ Hub-Chowki.

Each article of the draft standard was discussed in detail and, as a result, several amendments/changes were suggested. Mr. Aziz-ur-Rehman from Petroman, Karachi was of the opinion that basic electronics relevant to the trade should already be introduced at Basic Level (Grade III) of the standard. Majority of the members, however, expressed the view and it was decided that this subject should be covered at Intermediate Level (Grade II).

The meeting resumed on the second day (1st September) and the members reviewed the contents and the amendments agreed on the draft standard.

The Secretariate informed the Committee members that a revised copy of the National Occupational Skill Standard for Maintenance Electrician(Industries) incorporating the amendments agreed at the meeting would be prepared for circulation to all the members.

The meeting ended at 1300 hours with a vote of thanks to the Chair and the members for their valuable contributions in the preparation of the National Occupational Skill Standard for Maintenance Electrician (Industries).

Prepared by:

[Signature]

NAZIR AHMED KHURSHID
Secretary
NATIONAL OCCUPATIONAL SKILL STANDARD

FDR

MAINTENANCE ELECTRICIAN (INDUSTRIES)
FOREWORD

The National training Board was created under terms of the National Training Ordinance of 1980 with an authority to regulate and promote vocational training in Pakistan. It is charged with the responsibility to:

i) collaborate with the sources of labour market information as determined from a survey of establishments with a view to assessing on a continuing basis existing and future training needs, both local and foreign;

ii) systematically study existing training programmes with respect to their relevance, duration and size and recommend such measures to be taken as seen desirable in the light of this study;

iii) establish criteria for evaluating and determining training programmes and facilities;

iv) develop training syllabi and establish and specify national training standards and trade tests without prejudice to any existing programme being implemented by Provincial Government under an agreement with a foreign Government;

v) supervise such training programmes as are funded from the Federal budget;

vi) prepare national training plans, programmes and projects in view of local as well as foreign manpower requirements and submit them for the approval by the Federal Government;

vii) recommend to the Federal Government means for financing training programmes;

viii) promote and finance training of establishment-based or institution-based training officials and instructors;

ix) organise and conduct seminars and workshops for various types of persons associated with training activities;

x) collect and compile statistics related to training;

xi) co-ordinate the working of Provincial Boards;

xii) review existing and proposed legislation on vocational training and recommend necessary legislative provisions with the concurrence of the Provincial Boards;
xiii) issue to establishments or institutions for compliance directives within the framework of the approved plans and projects; and

xiv) do all other acts necessary for carrying out the purposes of this Ordinance.

An occupational skill standard is defined as a written specification setting out the requirements of knowledge and skills with respect to a particular occupation, i.e. welder, automotive mechanic, etc. These standards will be used as basis in the development of training programmes and in the implementation of occupational skill testing and certification. These standards in brief will ensure that the trainee has acquired the minimum level of skill to perform satisfactorily in a specific occupation.

The objectives of the occupational skill standards testing and certification programme are:-

a) to improve industrial relations and provide industry with workers whose scope and level of job knowledge and skills are identified;

b) to assist in human resources development by providing a precise means of assessing the country's skilled manpower both quantitatively and qualitatively;

c) to create an incentive and desire for workers to attain a high level of knowledge and skills competency in their respective trade or occupation and award them a skill certificate which is nationally acceptable;

d) to establish a common basis for coordination and cooperation among employers, workers and government relating to human resources development programmes;

e) to provide technical and vocational training institutions basis for developing curricula that will reflect the requirements of industry;

f) to establish a basis for conducting occupational skill testing and certification;

g) to facilitate the mobility of skilled workers.

On attaining the above objectives, the following benefits could be derived:-

For the workers ..., clearer idea as to the degree of competence to strive for; skills certificates issued can be used as passport to appropriate jobs.
For Industries ... reduced recruitment cost; improved job skills matching; fair compensation scheme.

For Education and Training Institutions ... more relevant training programme; better quality graduates.

For the Government ... rational income/wage policies; relevant manpower training programmes; consistent manpower information; more realistic national manpower plan.

In order to give detailed consideration to the development of national occupational skill standards, the National Training Board appointed Technical Committee composed of trade experts to advise on the contents of the skill standards and the appropriate skill tests.

The members of the Technical committee for Electrical Trades and the Secretariat who prepared this National Occupational Skill Standard for Maintenance Electrician (Industries) are as follows:

1. Mr. Muhammad Inayat, Associate Professor (Elect) National Technical Teachers Training College, H-8, Islamabad

2. Syed Birjees Asghar, General Manager, PECO, Lahore

3. Mr. W. Wolter, Dy. Project Manager, Pak German TTC, Hub Chowki

4. Mr. Aziz-ur-Rehman, Electrical Engineer, Petromen, Karachi

5. Mr. Muhammad Ayub, Senior Instructor, Swedish Pakistanis Institute of Technology, Sujrat

6. Mr. Nisar Khan, Principal, Technical Training Centre, Haripur
7. Syed Majid Hassan Naqvi, Principal, Ahmed Hassan Polytechnic Institute, 4-Langley Road, Lahore

8. Mr. Manazir Imam, Instructor (Elect) MTC, PAKSTEEL, Karachi

9. Mr. Rahim Bux, Senior Instructor, Technical Training Centre Kotri

10. Mian Muhammad Munir, All Pakistan Federation of Trade Union, 28-Nisbat Road, Lahore

11. Mr. Zubair Habib, Plant Engineer, Union Industry Ltd, Karachi

12. Mr. Muhammad Aslam, Principal, Technical Training Centre, Khuzdar, Quetta

13. Mr. Bashir Akhtar, Principal, Technical Training Centre 96-Gulberg, Lahore

14. Mr. Afzal Malik, Joint Director, ATC, Islamabad

15. Mr. Muhammad Munir, Head of Programme Director, National Training Development Institute, Islamabad

16. Mr. A. Nachor Consultant ILO Expert on Occupational Skill Standard, Trade Testing and Certification, National Training Bureau Islamabad

17. Mr. Nazir Ahmed Khurshid, Secretary/Member Assistant Director, NTDI, Islamabad

The National Training Board wishes to express its sincere appreciation and thanks to the Chairman and the members of the Technical Committee who so generously contributed their valuable time, expert advice and co-operation in developing said National Occupational Skill Standard.
NATIONAL OCCUPATIONAL SKILL STANDARD

FOR

MAINTENANCE ELECTRICIAN (INDUSTRIES)

1. GENERAL

1.1 The Occupational Skill Standard referred to relates specifically to workers at craft level and is directly related to the skills, equipment, tools and materials in common use in Pakistan at the present time.

1.2 This Occupational Skill Standard is divided into three grades or levels. These are:-

1.2.1 The Basic Level .......... Grade III
1.2.2 The Intermediate Level ... Grade II
1.2.3 The Advanced Level ....... Grade I

(Note: The Basic and Intermediate Levels of this standard have been given priority considerations setting aside for future development the requirements under the Advanced Level)

1.3 The Basic Level relates to the level of knowledge and skills expected from a craftsman in this trade who is a matriculate and has completed training in an institution of equivalent standard or from those who already have to their credit at least two (2) years of recognised "on-the-job" experience.

1.4 The Intermediate Level falls approximately midway between the advanced level and the basic level. It relates to the level of knowledge and skills expected from craftsmen who have completed two (2) years of full-time institutionalized training programme conducted according to this standard or from those who have passed the trade test at Basic Level (Grade III) followed by two (2) years of relevant "on-the-job" experience or from those who already have gained at least four (4) years "on-the-job" experience relevant to this trade.

1.5 The Advanced Level is based on the highest level of knowledge and skills expected from a craftsman in this trade.

1.6 This Occupational Skill Standard will be subject to a periodic review and modifications to be responsive to the changing technology and to the requirements of the industry.
1.7 Persons who are wishing to be certified as competent in any of the three grades should undertake a trade test to be designed to show by oral and/or written examination and by practical demonstration that they are in possession of the knowledge and skills set out in this standard.

1.8 The emphasis in all certification tests will be on objectivity and the requirements of the industry.

2. **BASIC LEVEL (GRADE III) MAINTENANCE ELECTRICIAN (INDUSTRIES)**

**KNOWLEDGE REQUIREMENTS**

- **Safety in Working with Electricity**
  
  - General safety to be observed in working with electricity
  
  - Protection against electric shock
  
  - Common types and rating of fuses and miniature circuit breaker for protecting electrical installation
  
  - Types and function of safety switches
  
  - Purpose and methods of grounding equipment

- **Trade Mathematics**
  
  - Basic trade calculations (addition, subtraction, multiplication and division) including whole and decimal numbers, fraction and percentages
  
  - Linear Equations
  
  - Basic Trigonometry and the Phytagorean theorems, sin-cos
  
  - Concept of measuring units/scales and conversion

- **Basic Electricity**
  
  - Phenomena of electricity and methods of generation
  
  - Voltage, current and resistance, their units and relationships; Ohm's Law and its simple applications and concept of voltage drop
  
  - Concept of electrical/mechanical power/work, methods of measurement and calculations
  
  - Concept of magnetism and electro-magnetism - magnetic field and electromagnetic field

- **Electrical Materials**
  
  - Conductors used in wiring (copper & aluminium), their sizes/current-carrying capacity and colour-codes
  
  - Insulators for low and medium voltage ranges
  
  - Soft soldering and purpose of flux
Resistors and Capacitors

2.17 Type of resistors (fixed and variable), e.g. carbon composition, wire wound, thin film, metal oxide and fusible
2.18 Power rating and colour codes
2.19 Types of capacitors, e.g. paper, mica, electrolytic, ceramics, plastic, mylar and their colour codes
2.20 Working voltage, charge and polarity of capacitors

DC Circuits

2.21 Resistors in series and parallel circuits including calculations for resistances
2.22 Voltage and current distribution in series and parallel circuits

Alternating Current

2.23 Concept of alternating current (AC), frequency, cycle peak value, root mean square value and average value
2.24 Single and three-phase network

AC Circuits

2.25 Capacitive reactance (Xc)
2.26 Inductive reactance (XI)
2.27 Impedance and power factor
2.28 Calculations for capacitive and inductive reactance
2.29 Calculations relating to single-phase circuits three phase system & connection

Transformers

2.30 Construction and principles of simple transformers
2.31 Transformation ratios

Batteries and Cells

2.32 Types and sizes
2.33 Series and parallel connections
2.34 Maintenance requirements

Single-Phase and Three Phase Induction Motors

2.35 Basic type and application of single-phase and three-phase induction motors, their controls and protective devices
2.36 Understanding and interpreting the information in the nameplate
SKILL REQUIREMENTS

0 Safety Precautions

2.37 Work according to general workshop safety rules and regulations and demonstrate safe working procedures
2.38 Demonstrate first-aid treatment for electric shock, including application of artificial respiration

0 Hand Tools/Instruments

2.39 Use and maintain common hand tools used to carry-out bench work and measurements
2.40 Use and maintain common electrician hand tools, test and measuring instruments

0 Electrical Materials

2.41 Identify, select and use common wiring cables for domestic and industrial electrical installations as regards to type, size and current-carrying capacity
2.42 Identify and prepare for use standard accessories in respect to cables, metal conduit and PVC conduit wiring systems and install them according to standard practices
2.43 Identify, select and use common metals and alloys in electrical work
2.44 Identify, select and use appropriate lubricants and coolants in electrical work
2.45 Identify, select and use correct fuses, miniature circuit breakers and switches for protecting electric-circuit
2.46 Identify, select and use correct insulating materials
2.47 Identify, select and use non-flammable adhesives
2.48 Identify select and use common types of solder and flux
2.49 Identify, select and use common types of cable sockets/lugs
2.50 Identify, select and use correct resistors, inductors and capacitors

0 Jointing of Cables

2.51 Perform common types of cable joints, e.g. tee joints, married joints, cross-joints, britannia joint, scarf joint
2.52 Join cable sockets/lugs to terminal by soldering
2.53 Crimp sockets/lugs to terminal
2.54 Join cables using co-axial connectors
Wiring Installation

2.55 Select correct size of metal and PVC conduits and cut to required length using appropriate tools
2.56 Cut internal and external threads using taps and dies and make simple bends in metal/PVC conduits and install them according to standard practices
2.57 Perform wiring from main switch to distribution fuseboard for single phase lighting from given layout diagram
2.58 Fabricate and install conduits for wiring installations
2.59 Perform surface wiring (cable) and concealed wiring (PVC/metal conduits) incorporating lighting and powers for single phase domestic and industrial types of installations
2.60 Perform surface wiring (cable) and concealed wiring (PVC/metal conduits) incorporating lighting and powers for three-phase, four-wire supply system for domestic and industrial wiring installations
2.61 Wire and install fluorescent lamps for single and twin tubes, trace faults and rectify defects in light fittings
2.62 Carry-out different types of tests in wirings (polarity, insulation, continuity and earth leakage)
2.63 Install energy meters and distribution boards for domestic and industrial wiring installation systems
2.64 Trace and rectify faults in single phase house and industrial wiring systems

Test and Measuring Instruments

2.65 Set, connect and read voltmeter, ammeter, ohm meter, multimeter, power factor meter, watt meter and frequency meter
2.66 Set and use clamp-on meters/tung tester
2.67 Install and read single-phase kilowatt-hour meter
2.68 Install and read three-phase kilowatt-hour meter
2.69 Set and use earth resistance tester
2.70 Set and use insulation tester

Appliances and Components

2.71 Read and interpret diagram of domestic appliances and components (e.g. fans, electric heater, drilling machine, switches/contactors and transformers) - test, locate and repair faults in these appliances and components
2.72 Carry-out commissioning test for domestic appliances
2.73 Protect appliances from overload and earth fault using appropriate safety device, e.g. fuse or miniature circuit breaker (MCB)
Single-phase and Three-phase Induction Motors

2.74 Install and connect power supply including protective devices for single-phase and three-phase motors with camshaft switches/contacts.
2.75 Connect capacitors for single-phase motors.
2.76 Maintain and carry-out simple checks on motors, e.g. dismounting, dismantling, cleaning, replacing and greasing the bearings, checking for open and short circuit, checking for earth connection and assembling the motor.
2.77 Select and install different types of protective devices.
2.78 Solder, crimp and braze cable lugs.

Drawing

2.79 Use and maintain drafting tools, instruments and equipment.
2.80 Draw lines, write various styles of lettering and numbering.
2.81 Draw plane pieces and simple geometrical figures.
2.82 Draw orthographic projections of simple objects in:
   a) First Angle Orthographic Projections
   b) Third Angle Orthographic Projections
2.83 Identify and draw standard symbols for electrical components and fixtures.
2.84 Trace and draw basic installation circuits/wiring diagrams.
2.85 Prepare sine curve and vector diagrams.
2.86 Trace and draw contactor circuits, motor switch circuits and motor control circuits for single and three-phase systems.
3. Intermediate Level (Grade 11) Maintenance Electrician (Industries)

Knowledge Requirements

- **Safety**
  3.1 Function and operation of circuit breakers, causes of overload and short circuits
  3.2 Types of Fires and Fire Extinguishers

- **Electrical Technology**
  3.3 Conversion of electrical energy into other forms of energy and common applications
  3.4 Series and parallel resonance circuits
  3.5 Compensation
  3.6 Vector diagrams
  3.7 Application of high voltage circuit breaker
  3.8 Three-phase circuits, including load balancing

- **Electrical Materials**
  3.9 Calculation for size of wires and the use of current tables for wires and cables
  3.10 Insulators for high voltage range

- **Single-phase and Three-phase Motors**
  3.11 Construction and operation of single phase motors (e.g. repulsion, capacitor, shaded pole and universal motors)
  3.12 Construction and operation of three-phase motors (e.g. squirrel-cage, wound rotor, slip-ring and synchronous motors)
  3.13 Understanding and interpreting information/data in the nameplate of AC Motors and generators
  3.14 Control starters for single-phase and three-phase motors (direct on-line, star-delta, resistance, liquid resistance, auto-transformer)
  3.15 Switchboard and motor-control centre

- **DC Machines**
  3.16 Principles of DC motors and generators
  3.17 Power and efficiency
  3.18 Construction and operation of series motors and generators
  3.19 Construction and operation of shunt motors and generators
  3.20 Construction and operation of compound motors and generators
  3.21 Mechanical power/work, including measurement and calculations
3.22 Starters and controllers
3.23 Protective devices

- Transformers

3.24 Types, construction and operation of:
   a) Single-phase transformers
   b) Auto-transformers
   c) Three-phase transformers - their connections and vector diagram
   d) Instrument transformers

3.25 Cooling systems
3.26 Tap changing
3.27 Paralleling of transformers
3.28 Protection systems

- Batteries

3.29 Testing procedures to determine condition of battery
3.30 Charging procedures and rates of charging

- Domestic and Industrial Wiring

3.31 Space factor for conduit, trunking and ducting
3.32 Methods and requirements of laying wires and cables
3.33 Voltage drop and diversity factors
3.34 Estimation of materials and equipment
3.35 Emergency lighting
3.36 Alarm systems
3.37 Uninterrupted power supply
3.38 Voltage stabilizer

- Diesel Generator Set

3.39 Principles of AC generators and their types; excitation and brush-less excitation
3.40 Operation of generator
3.41 Emergency stop of generator
3.42 Distribution of generator power according to requirements
3.43 Servicing of generator set

- Maintenance

3.44 Recording motor/application data
3.45 Maintenance schedule of electrical machines and equipment

- Illumination

3.46 Requirement of illumination
3.47 Types of lamps
3.48 Efficiency
Electronics

3.49 Introduction to semi-conductor electronics
3.50 PN Junction
3.51 Use of diodes in rectifier circuits
3.52 Stabilizing by zener diodes
3.53 Introduction to transistor
3.54 Transistor as switch and amplifier
3.55 Use and application of SCR and triac
3.56 Introduction to opto-electronics

SKILL REQUIREMENTS

Safety

3.57 Demonstrate rescue procedures for electric shock victim
3.58 Demonstrate the use of fire fighting equipment

Measuring Instruments

3.59 Set and read flux-meter, frequency-meter, power factor meter, megger & earth tester
3.60 Select and use current transformers for instrumentation connections
3.61 Select and use potential transformers for instrumentation connection
3.62 Use and interpret cable-fault locator and cable locating tools

Circuit Diagrams

3.63 Trace and draw starter-control circuits for squirrel-cage and slip-ring motors for both single-phase and three-phase machines (direct-on-line, liquid resistance, auto transformer star-delta for both manual and automatic operations)
3.64 Trace and draw circuit of earth leakage circuit breaker
3.65 Trace and draw DC control circuits for motors and generators
3.66 Trace and draw the circuit diagram of two transformers in parallel

Wiring Installations

3.67 Run cables/wires into the conduit installations and connect all accessories
3.68 Perform wiring of control circuits for single-phase and three-phase AC motors
3.69 Perform wiring of control circuit for DC motors
3.70 Perform wiring of control circuit for alternators and DC generators
3.71 Install and connect single-phase energy meters
3.72 Install and connect three-phase energy meters
3.73 Install and wire alarm circuit using indicators
3.74 Install conduits, trunking and ducts for domestic and industrial wiring installations and illumination
3.75 Install oil circuit breakers/switch gears for low-voltage system
3.76 Install and wire distribution fuse board and circuit breakers
3.77 Install and wire distribution fuse board for three-phase
3.78 Install dimmers and fans

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Single-phase and Three-phase Motors

3.79 Connect/Install appropriate starters for motors
3.80 Make terminal connections to change the direction of rotation of motors both single-phase and three-phase motors
3.81 Select and install appropriate devices to protect motors from overload and earth faults

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Diesel Generator Set

3.82 Prepare diesel engine to start
3.83 Set switches for required distribution of generator power
3.84 Start and stop the generator
3.85 Servicing the generator set
3.86 Tracing and identifying terminal connection of the generator
3.87 Identify protective devices, locate and rectify faults

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DC Machines

3.88 Install and connect series motors, shunt motors and compound motors
3.89 Select and install appropriate devices to protect motor from overload and earth faults

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Transformers

3.90 Install and connect single-phase transformer
3.91 Install and connect three-phase transformer
3.92 Install and connect auto transformer
3.93 Install and connect instrument transformers
3.94 Install and connect appropriate devices to protect transformers from overload, earth faults and internal faults

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Batteries

3.95 Maintain and test batteries, including capacity test
3.96 Charge batteries by slow or fast charging procedure
3.97 Maintain and operate battery charger
Electronics

3.98 Identify and select components, e.g. diodes, zener diodes, transistors, SCR, triacs, diac and photo components
3.99 Test components
3.100 Solder components according to diagrams, e.g. power supplies, speed control & AC load control
3.101 Test the circuits
3.102 Troubleshooting

Testing and Commissioning (Under Supervision)

3.103 Inspect and test relays, thermostats, fuses and miniature circuit breakers (MCB), etc.
3.104 Inspect and test starters
3.105 Test and trouble-shoot single-phase motors
3.106 Test and trouble-shoot three-phase motors
3.107 Test and trouble-shoot DC motors
3.108 Test and trouble-shoot DC generators
3.109 Test and trouble-shoot single-phase and three-phase transformers
3.110 Test and trouble-shoot electrical appliances
3.111 Test and trouble-shoot circuit breakers
3.112 Test and trouble-shoot earth-fault relays
3.113 Test and trouble-shoot protection circuits
3.114 Test earth-loop impedance of an installation