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ASSISTANCE TO PAKISTAN AUTOMOBILE CORPORATION/ MANUFACTURING ENGINEERING ASSISTANCE TO VENDORS

DP/PAK/83/014

PAKISTAN

Report of the evaluation mission*

Prepared in co-operation with the Government of Pakistan,
the United Nations Development Programme and the
United Nations Industrial Development Organization

United Nations Industrial Development Organization

Vienna

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SUMMARY OF IN-DEPTH PROJECT EVALUATION

PART A (to be completed by evaluation team)

Project Number: DP/PAK/83/014

Project Title: Assistance to Pakistan Automobile Corporation/Manufacturing Engineering Assistance to Vendors

Executing Agency	UNDP Budget ($)	Date Project Approved	Dates of Evaluation
UNIDO	1,788,320	October 1983	11-21 November, 1-4 December 1987

Government Implementing Agency	Gov't. Budget (Rupees)	Date Operations Started
Pakistan Automobile Corp./ Ministry of Production		March 1985

I. Summary of project objective and outputs

To establish a Vendor Development and Training Cell in the Pakistan Automobile Corporation in Karachi capable of providing technical advisory services, automotive component testing, information and technical training to vendors of the automotive industry. The outputs cover the establishment of six sections capable of providing these services.

II. Purpose of the evaluation mission

A joint in-depth evaluation of the project was scheduled to analyze whether the "project design is compatible with the achievements of the project so far, in order to permit the reformulation of objectives and activities, if considered necessary for the achievement of concrete and realistic results at the completion of project activities scheduled for March 1989".

III. Findings of the evaluation mission

The principle of VDTC has been adequately justified, evidenced by the use and appreciation, although limited, of the services provided to date to the industry. However, although the existing organization has established some encouraging relations with a number of clients, unfortunately the vital consultancy aspect of the service has been mainly assured by visiting experts and the CTA and has certainly been much appreciated by vendors receiving advice. The experts' ability to train counterpart personnel has been largely constrained by the lack of counterparts. The experts have contributed considerably to the courses and seminars conducted at VDTC. Only a few courses have been institutionalized.

The establishments visited by the evaluation team were selected because they had co-operated and/or benefitted from VDTC services in a form or another. Although VDTC is still in its infancy, there is a need to establish more formal linkages with other institutions providing parallel and/or complementary services to industry.

The major problem is the insufficient staffing at VDTC. In short, the attainment of the immediate objective of the project is dependent on a prompt satisfactory solution of these problems, after which VDTC should be able to look forward to a rapid expansion of its organization and spread of its influence.

IV. Recommendations of the evaluation mission

Recommendations, thirty-one in all, are difficult to summarize. The reader should refer to page 43 of this report. They cover ways to improve project implementation, performance, means to maximize local available resources, suggestions on actions required during the project's transition period and finally there is a recommendation to assess implementation progress approximately one year from now.

V. Lessons learned

- Early identification of severe project implementation trouble could be greatly facilitated, if the project document is fully defined in compliance with UNDP/UNIDO policy and procedures.

- Mid-term evaluations should be more frequently conducted for projects with substantial implementation delays. Often project design problems and external factors prevent timely implementation. Mid-term evaluations can help identify obstacles and catalyze effective action to get around them before it is too late.

- At the outset of the project it should be understood that industrial research and service have to be able to attract staff more competent than those working in the industrial production units requiring assistance.

- In most developing countries reside highly qualified nationals capable of providing international level consultancy assistance to local industry, but do not find the means to do so. Industrial research and service institutions should develop mechanisms to facilitate the provision of such services to where they are required.

- Testing and information services to industry is a good starting point in developing an industrial research and service institution.

- Industrial Research and Service Institutions can already at an early stage play a catalytic role in organizing seminars, conferences, lectures and generally provide a forum for industry to discuss mutual problems and decide on actions which could be undertaken to solve them.

- Industrial Research and Service Institutions should be closely linked with an association of the industry it is supposed to serve. If one does not exist, the IRSI should promote its establishment.

VI. Evaluation team

Mr. Bernard Wild, UNDP Consultant, Team Leader
Mr. Muhammad Sarwar Zahid, Deputy Chief, Ministry of Production, Government of Pakistan
Mr. Hans Heep, Evaluation Officer, UNIDO, Vienna

PART B (to be completed by UNDP Resident Representative)

I. Report of the Evaluation Mission sent to

II. Comments of UNDP field office

PART C (to be completed by UNDP or Executing Agency headquarters)

(summarize comments on technical and managerial aspects of findings, recommendations and lessons learned)

PART D (to be completed by the UNDP Resident Representative 12 months after the completion of the evaluation)

Follow-up taken place

CONTENTS

INTRODUCTION

Brief history

The immediate objective of the project is to establish the Vendor Development and Training Cell (VDTC) as a Pakistan Automobile Corporation unit in Karachi to provide technical advisory services, automotive component testing and technical training to vendors of the automotive industry. The setting of the project at its inception was one of projected expansion of the market for automotive products in Pakistan, and the aim of achieving 80% indigenous production of components by 1989 as against the then current level of 20-60% on different vehicle models. It was expected that the assistance to vendors to be provided by VDTC would stimulate the private sector and provide additional employment opportunities. There was also evidence that the quality of locally made components was often below the required standard, and that it was time "to give quality and precision its long awaited consideration".

In Pakistan, automotive vehicles, including agricultural tractors, are produced primarily by importing individual components and sub-assembling complete vehicles. Therefore, the major portion of a vehicle cost (as well as its individual component parts) is represented by imported items.

The Government of Pakistan would like to change this situation so that a significantly larger portion of an automotive vehicle from both the cost and component points of view will represent indigenous labour and material. This goal is consistent with Pakistan's development objectives of

- improving the international foreign exchange position;
- achieving greater employment within the country;
- strengthening the country's manufacturing capability;
- developing Pakistan's economic self-sufficiency.

The project was signed in October 1983 and effectively commenced on the arrival of the original Chief Technical Adviser (CTA), Dr. Momir Mrdovic, in March 1985.

A joint UNDP/UNIDO/Government of Pakistan in-depth evaluation of the "project was scheduled to analyze whether the project design is compatible with the achievements of the project so far, in order to permit the reformulation of objectives and activities, if considered necessary to the achievement of concrete and realistic results at completion of project

activities, scheduled for March 1989" (please refer to Annex I for the evaluation terms of reference).

The evaluation team was composed of the following members:

Mr. Bernard Wild, UNDP Consultant, Team Leader
Mr. Muhammad Sarwar Zahid, Deputy Chief, Ministry of Production, Government of Pakistan
Mr. Hans Heep, Evaluation Officer, UNIDO, Vienna

The UN team visited Pakistan from 11 to 21 November 1987 and was joined by Mr. Zahid on 15 November.

On 11 November a brief review of the situation at VDTC and in the automotive industry in Pakistan was made with Brig. M.A. Faruqui, General Manager of VDTC, and Mr. Paul Winter, the UNDP/UNIDO Chief Technical Adviser. The following day visits were made to: The Pakistan Standards Institute (PSI), Karachi, and the Central Testing Laboratories (CTL), Karachi.

Between 14 and 18 November visits were made to five companies in the public sector and seven visits to some in the private sector - (both vendors and assemblers). The objective of these visits was to assess their manufacturing capabilities and their association with and use of VDTC facilities and their perception of the Cell's usefulness. Their views on the development of the automotive industry in the country were also solicited.

On 15 November a visit was made to PACO Head Office to discuss issues regarding the development of the automotive industry, its capacity to produce components and parts locally and the role of VDTC in its development. On the same day a meeting was arranged with a group of vendors in order to obtain their views in an open and frank discussion. Unfortunately, only three persons came, all from assemblers. The discussions were, however, fruitful.

On 19 November a meeting with the evaluation team and Brig. Faruqui and Mr. Winter took place at VDTC to review the findings of the mission. The progress made in the implementation of the various activities of VDTC was discussed and clarifications of shortcomings and pertinent data were obtained.

In the afternoon of the same day the mission team accompanied by Brig. Faruqui and Mr. Winter received the visit at VDTC of Mr. Kunwar Idris, Chairman of PACO. Staffing problems were discussed as also the organization

of VDTC on scientific lines, and measures to be taken to facilitate recruitment and make the career-opportunities more attractive to the highly-qualified persons necessary to make VDTC a real centre of excellence.

The mission's programme was concluded by a meeting on 21 November, during which the team presented a summary of their findings and recommendations to the VDTC General Manager, CTA, the Chairman of PACO and the UNDP Resident Representative, Mr. Vunibobo, who joined them for the occasion. The analysis provided by the evaluation team was well received.

Return to Vienna

As agreed in Karachi, the two UN members of the mission reassembled in Vienna. From December 1-4 inclusive, Messrs. Wild and Heep reviewed the various charts, tables, reports and comments obtained to compile the present report.

On 4 December the team debriefed Mr. Swamy-Rao, UNIDO Senior Inter-regional Adviser, Engineering Industries (please see Annex II for a list of persons met).

The mission members wish to express here their gratitude for the wholehearted co-operation and assistance consented by all persons contacted during their visit to Pakistan.

CHAPTER I: PROJECT CONCEPT AND DESIGN

A. Socio-economic and institutional context of the project

Background

The Government has sanctioned the assembly-cum-manufacture of motor-cycles, cars, trucks, and agricultural tractors to a number of companies. It has, however, laid down a provision that within a certain time frame up to 80% of the components of the vehicle will have to be manufactured locally. The incentive given to the industry is that import duties on completely knocked down kits are lower than on fully assembled vehicles.

The problems of the automotive industry in Pakistan at the time when the project was approved continue to today. What follows is an overview of these problems and explanation of the role VDTC is intended to play in resolving them.

Manufacturing methods

The decision to establish an automotive industry stems from a desire on the part of Pakistan to increase its industrial and manufacturing capability, while at the same time being able to provide means of transport at a low cost. The planned scenario in Pakistan was to import initially vehicles in kit-form in which all the major parts come fully assembled, and the only local requirement is assembly, painting and final finishing. The second stage is when vehicles come in fully disassembled kits, known as completely knocked down (CKD) condition. At this state a full-fledged assembly line should be set up, and quality assurance systems have to be established. The local deletion of parts should then follow. The development and manufacture of the components should start according to a planned deletion programme. The development of components locally is, however, dependent on the state of development of the local manufacturing industry.

As soon as each component is developed it is tested for acceptance by the manufacturers, and after approval its import is stopped. The manufacture of components locally requires complete details of the drawing. Its materials, its manufacturing processes, and its testing standards. In this process considerable assistance and very close collaboration is required between the assembler, and part manufacturing company or the vendor.

In Pakistan assembly of automotive vehicles had started in the early 50's, but the assembly operation did not grow and in fact petered out very soon due to unrestricted import of fully assembled vehicles. Only in the 60's did the project for the assembly manufacture of Bedford/GM Vehicles start with a properly planned component deletion element. The local component manufacture part of the programme proceeded at a very slow space and even twenty years or so after the start the percentage of deletion achieved has been around 60% despite major efforts taking place after the nationalization of the industry. In the 1960's assembly of tractors was also started. Here also deletion has been very slow, except for Millat Tractors, who after nationalization have achieved approximately 62% deletion. The first motorcycle assembly plant started in the late 1950's but the percentage of deletion achieved has also been very low. Despite an early start in this field not enough component manufacturing industry has come up. One of the major reasons for this lack of growth was the unrestricted import into the country of many makes and models of vehicles in fully built-up condition and the unrestricted import of spare parts, from all over the world. Although some restrictions are imposed today there are still too many models being imported into Pakistan.

Spare parts manufacturing

The process of local manufacture of automotive parts only started in the late 1960s with the efforts to carry out local manufacture of parts for the Bedford truck, at that time there was no worthwhile specialized manufacturer of any automotive component. This industry thus started from scratch. A great demand was placed on the local industry during the 1965 war when local manufacture of parts for equipment for the Defence Services became essential. This was followed up later with the efforts by the Defence Services to manufacture the Jeep locally. This three year effort resulted in developing almost 80% of the parts of the jeep locally and production of about 250 jeeps. However, this project was abandoned, and large-scale production of the developed components could not be carried out. This was a deterrant to the industry, as the manufacturers who had developed the parts could not recover their expenses.

The start of the assembly of agricultural tractor in the 70's and specially after the nationalization of the assemblers saw an increase in the efforts to develop the spare parts locally, and gradually the efforts of the assemblers started paying dividends as parts for tractors, specifically Massey

Ferguson tractors, started being produced. Up to now approx. 60% of components of Massey Ferguson tractors are being manufactured locally. This had led to some improvement in the engineering industry, and a capacity and capability has been created to produce pressed steel parts, fabricated parts, cast parts, and some electrical components for tractors and trucks.

With the start of the Suzuki assembly-cum-manufacture project in 1983 the focus of parts manufacture development has switched over to cars and light vehicles. Initially development and manufacture of simple press and fabrication parts were simple, but as the sophistication of the parts has grown, so also problems in local development of these parts have increased and the pace of creation of local manufacturing capability has not grown at a satisfactory pace.

Problems of auto component manufacturers

Although Pakistan started assembly operation of vehicles at a fairly early stage, the growth of the component manufacturing industry has not adequately taken off. Most of the efforts in industrialization have focussed on either heavy industries or in process industries. The light engineering industry remains a disorganized sector. The manufacturing facilities are restricted to small- and medium-sized multi-functional units who can do a bit of everything, but do not have specialization in any particular field. The level of technical knowledge and manufacturing facilities in these units is low, and the quality of production is poor.

Most small units start undertaking the development and manufacture of auto components for the first time as an ancilliary to their other production programmes. Their efforts in the development of automotive components is hampered by lack of specific production/processing techniques, non-availability of the required materials and in general lack of technical know-how. The production of car parts has posed many problems, as they tend to be more sophisticated than tractor parts and require much tighter adherence to specifications and sizes. Whereas some vendors could possibly produce parts for tractors, he would not be able to meet the quality requirements for car parts, without the use of accurate jigs and fixtures and strict adherance to quality.

Quantities

The range of types of automotive vehicles being assembled and manufactured is large but the quantity of each type is small, so the volume of each part to be produced is low. Added to this is the fact that assemblers are reluctant to get their parts manufactured from one vendor, and for each part there are on an average two to three vendors, thus each vendor has an order for at the maximum 5,000 parts per year. This dissipation of manufacturing efforts has resulted in the proliferation of small to very small vendors who do not have the means to increase their quality or to improve their production capacity.

With the low volume of parts to be produced there is very little incentive for vendors to invest in equipment and material for large-scale production. It would logically follow that with increased production, more efforts will be made by the vendors to reduce rejection by improvement in quality, and introducing better technology to economize in cost of production. The opportunity of increased production with a consistent return will lead to specialization. Once a vendor specializes in the manufacture of a particular component or part it is easier for him to develop and produce similar components for different makes of vehicles.

The disadvantages of the small demands for parts are that vendors accept orders as a side business and thus cannot give enough attention and effort to its production. Moreover, since quantities are small, the vendor is not prepared to invest in new/improved technologies.

Materials

The vendors face problems in obtaining materials specified by the assemblers. Foreign automobile manufactures specify materials in their drawings and stress their use. The problems of vendors in Pakistan is considerable, when fourteen companies from five countries are each specifying different materials. Even common items like sheet metal may have different specifications. The problems of finding out equivalent materials to those specified is an exercise by itself, but obtaining that material is even more difficult. The result is that in quite a lot of cases different materials have to be imported for each similar part to meet the requirements of the original equipment manufacturers.

The vendor has not only the problems of finding the specified material or its equivalent, but in obtaining it through local purchase or import. Local availability is quite doubtful and import in the quantities required by the vendor for the small level of production makes it very expensive. The small vendor also cannot afford to keep large stocks of raw materials and tie up his capital. He is thus either forced to use low quality materials, or provide parts at a higher cost.

The need for the automobile industry in Pakistan is to standardize the specifications of raw materials used in their products. This will ensure that reasonably large quantities of the specific raw materials will be required which can then be commercially imported or produced locally if feasible.

Technology

Spare parts manufacturers as well as automotive manufacturers must constantly endeavour to develop materials and processes which reduce costs. The main focus should be on improved manufacturing processes. Manufacturing methods able to produce quality parts at a lower cost require advanced technology.

Conclusions

The automotive parts industry can be firmly established if vendors specialize in specific fields of manufacture. The progressive manufacture of automotive equipment in Pakistan has to depend largely on this base and cannot achieve the extent of deletion required unless this is done. Small vendors will have to expand and specialize to meet the requirements of quality, quantity and cost requirements of the assemblers.

Raw materials required for different makes and models of vehicles have to be standardized to the extent that is possible in order to allow for economies of scale. Efforts must continue for local production of the raw materials used.

Automotive parts manufacturers require a lot of technical assistance in development and manufacturing processes, material selection, procurement, product testing, and introduction of advanced technology geared towards better and more economical production.

The automotive parts industry faces a number of problems which are inter-related - non availability of proper materials, high costs of manufacture, lack of technology, lack of in-house quality assurance, etc. - but the major problem is that of low quantities of parts to be produced. If the demand of parts is increased substantially, the automotive parts industry is bound to develop, specialized vendors will develop, and this will not only enable the deletion targets to be met but will also meet the requirements of the spare parts market. It is imperative that serious thought is given to reduce the number of makes of vehicles being produced to one or at the most to two of each category. Moreover, this would enable the industry to fully respond to the advice and assistance VDTC is now providing and should in the future provide to the industry.

The Government of Pakistan at the time the project was approved aimed at 80% production of automotive components needed in six years time against present 20-60% ratio, mostly through sub-contracting. This was expected to stimulate the private sector and improve its performance. The deletion programme is being presently revised downward based on experience. Detailed information on changes could not be made available to the team. However, the need to develop the vendor industry will still be required. Vendor Development Training Cell can play a vital role in accelerating the process.

Pakistan Automobile Corporation (PACO)

The Pakistan Automobile Corporation Limited (PACO) a state corporation under Ministry of Production was created in 1973 in order to centralize the operation, growth and development of automotive industry in public sector in Pakistan. The need for an adequate scale of operation and centralized planning in the automotive sector was the basic criteria on governing the creation of PACO.

At present PACO controls ten production units manufacturing components (tools, dies, castings, pressed sheetmetal parts, wheels, engine blocks, cylinder heads) and assembling tractors, trucks, buses, light commercial vehicles, and motorcycles, cars, pick ups, and vans).

PACO has negotiated licence agreements with a number of international transport establishments to annually produce 20,000 tractors, 3,000 buses, 10,000 trucks, 10,000 light commercial vehicles, 40,000 cars with derivatives to meet all requirements and 4,000 jeeps. The programme is described as tough

but realistic bearing in mind the substantial manufacturing capacity in the country - at present underutilized in the state sector - and the incentive that will be given to private enterprises to play an equally important role as suppliers of specialized equipment estimated at about 60% of total product value.

Though the present prime activity of PACO units is to assemble these units, it is the National policy to gradually replace the imported components with locally produced items. A target has been set to achieve the production of PACO assembled vehicles with 80% locally produced items in six years time. In order to accelerate process in this area and to overcome the constraints mentioned earlier PACO established the Vendor Development and Training Cell.

Vendor Development nuclei already exist with a number of PACO's units, these, however, are to be strengthened and provided with means to make their role more effective. This calls for the development of the VDTC by PACO to assist in these undertakings. To reflect the value PACO is placing on this project, is its decision to have the project directly reporting to the Chairman of the Corporation.

Specific areas where VDTC can play a role

One of the basic activities needed for the indigenous production of automotive components is the introduction of precision casting technologies. PACO has the basic facilities required. However, they need technical assistance to manufacture automotive components according to specifications, especially to the smaller vendors.

Another area which requires special attention is the tooling (viz jigs, tools, fixtures, die and tool design). Demonstration/training and development of the techniques are required. A substantial number of VDTC activities should continue to be concentrated in these areas.

A material data bank is required to determine the specifications for all material required, advising on the corresponding specifications in various countries, follow price fluctuations and advise on proper suppliers and, when appropriate, advise on the necessary pretreatment(s) (viz heat treatment) which may be required. To avoid the present malpractice of using substandard, wrong, or just any available material for any job requested and in view of the nature of technical requirements of PACO's scheme which cannot accommodate any

departure from the designed specifications, it becomes necessary for VDTC to be able to test materials and advise on equivalents.

All the transport units planned to be produced by PACO are under licenses. All drawings should be properly documented and their handling organized. This will be the function of the documentation unit which also subscribes to a number of specialized technical journals, should prepare abstracts of the articles and important news and distribute these information among parties concerned.

To ensure that contracted jobs are properly done, and to support the contracted units, mostly small and medium units in the private sector, it is necessary to have a team of revolving specialized experts with the project who will discuss the jobs with the contractors, assist them in the first runs including shop floor demonstrations and advise them when needed.

Inspection and controlling the quality of products is a basic activity to evaluate the proper performance and manufacture. It is a main service that VDTC can provide. The VDTC will need to be equipped with the necessary tools and machines for dimensional chemical, physical, electrical and mechanical testing.

VDTC should assist industry to produce quality products and will demonstrate the introduction of quality consciousness and measures required to develop quality products.*

B. Project document

Objectives of the project

The development objectives of the project, as given in the original project document, reads as follows:

"The development objectives of the project are to:
- Gradually cut cost of imported automotive items;
- More utilization of indigenous labour and material;
- Strengthen country's manufacturing capability; and
- Develop Pakistan's economic self-sufficiency."

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* The text of this chapter on socio-economic and institutional context was adapted from studies prepared in Pakistan and was provided to the Evaluation Team by the General Manager of VDTC. The views of the Evaluation Team are reflected in the text.

The above statement represents a partial description of development goals which are, however, vague and too far moved from the objective of the project.

The basic problem to be addressed by the project was the general lack of competence and experience in developing country's infant automotive industry to produce, with a high content of locally-manufactured components, motor vehicles of acceptable quality at an economic cost, so that the industry can develop with all the advantages to the national economy which this implies.

More specific statements regarding Government of Pakistan's indigenization of the automotive industry policy should have been included in the development objective statement. A revision of the project document, dated 20 February 1986, states in the immediate objective statement that the project once established will reduce the percentage of imported components used for assembly of vehicles from 80% to 40%. This statement represents an achievement indicator at the development objective level. Regrettably the 20 February 1986 project revision did not attempt to amend the original development objective statement. Only the immediate objective and outputs were reformulated to reflect the institution building function of the project.

A 1982 draft version of the original project document, however, more correctly stated that, at the time the project was being discussed, a major portion of vehicle costs (as well as its individual component parts) were represented by imported items. The development objective was to change this situation so that a significantly larger portion of locally sold vehicles will from the cost, component and assembly point of view represent indigenous labour and material.

The development hypothesis of this project was that the assembly industry would need to increasingly rely on a large number of small sector manufacturing establishments to supply locally manufactured components and parts. In order to do so the vendor industry would need manufacturing engineering support to enable them to supply better quality components on time and on a cost effective basis this still holds true (refer to Chapter I.A).

The project's immediate objectives as revised on 20 February 1986 is stated at the correct level and reads as follows:

"To establish the Vendor Development and Training Cell in the Pakistan Automobile Corporation in Karachi to provide technical advisory services, automotive component testing and technical training to vendors of the automotive industry.

The Cell will provide technical advisory services to the automotive component manufacturers in:

- Training for technical personnel;
- Materials specifications;
- Developing thin-wall and precision casting of automotive components in PACO and vendor foundries;
- Process and methods engineering;
- Tools, die, jig and fixture design for production;
- Machining technology;
- Computer aided design and manufacturing;
- Gauge design and control."

Given this immediate objective, the function of the project was correctly identified to be an institution-building project.

Project inputs

Generally speaking, the February 20, 1986 revision corrected the short-comings of the original project document approved on October 27, 1983. In that the revised project provides a better specification of the Vendor Development and Training Cell by using the UNDP/UNIDO service module concept in the output section. Therefore, for each functional capacity and capability to be established at VDTC a separate output statement has been formulated. Since the VDTC has several organizational units charged with different responsibilities the respective definition of the operational capacity that will be developed by the project for each of these units have been formulated as separate outputs.

For example, outputs have been described as follows:

Output X - Name of section
- Functions to be performed
- Staffing required
- Methodologies, procedures, etc. required

Although an improvement over the original document was made, the job was only partially completed. In general, the output module specification in the February 20, 1986 revision has the following inadequacies:

(i) Although the kinds of services to be provided by each VDTC section (or module) were listed, the planned level of achievement of services by year should have been given.

(ii) Although the number of staff required and their rank is provided, their skills and experience should have been fully specified.

(iii) Not all outputs have a full specification of technical and scientific methodologies, testing and other procedures, guidelines, etc. which are required for the full functioning of the section (or module).

(iv) The specification of premises or facilities needed and specified by type (workshop office, laboratory, etc.) should have been provided.

(v) Equipment and supplies required for each section should have been provided.

(vi) A precise description of: VDTC clients; how large the market is; potential demand; how the services will be marketed; and how feedback information on the quality and utilization of services provided will be obtained, should have been provided.

(vii) The manner each section will be financed was not clarified.

As with most other UNDP/UNIDO projects, which have similar project design inadequacies, mutually agreed upon management decisions are taken during the life of the project, which clarify at least some of the information deficiences listed above. However, the lack of full output specifications has rendered the project document not fully useful for planning of implementation activities, guiding project management in preparing work and activity schedules required to develop VDTC to a point where it can provide the range of services to industry intended.

Many of the shortcomings experienced by the project could have been better identified earlier if the project outputs had been fully defined in the project document.

In addition the activities or main technical substantive steps required to be undertaken by project staff (national and international) to produce each output was not provided.

Under activities, a breakdown of the timing of the international experts has been provided in the February 1986 revision. Under the same heading, the national staff training requirements have also been provided. These listings represent project inputs and have therefore been mislabeled.

The lack of such basic information makes it indeed difficult to manage, monitor and evaluate a project.

CHAPTER II: PROJECT IMPLEMENTATION

A. Delivery of inputs

UNDP/UNIDO inputs

The originally approved budget and the current revised budget are summarized below:

Budget line		Original (A) Oct.83		Revision (J) Oct. 87	
		Budget $	m/m	Budget $	m/m
11-01	CTA - Expert in testing	338,700	48	303,805	43
11-02	Expert in automotive foundry	140,000	20	100,936	16
11-03	Expert in automotive docum.	26,600	4	13,670	2
11-04	Expert in material specs.	28,600	4	25,046	4
11-05	Expert in CAD/CAM	20,950	3	19,445	2.9
11-06	Expert in quality control	128,700	18	54,585	9
11-07	Expert in gen. auto manufact.	34,750	5	69,100	11
11-08	Expert in forging/press dies	-	-	34,763	9
11-60	Consultants	35,250	5	34,763	6
15	Travel costs	15,000		12,808	
16	Other costs	3,000		14,400	
18	Adjustments			(-221)	
19	Total personnel	771,550	107	683,100	107.9
31-00	Fellowships	118,200	54	132,100	
32-00	Study tours, group training	40,000		40,000	
	Total training	158,200	54	172,100	
41-00	Expendable equipment	70,000		60,673	
42-00	Non-expandable equipment	815,000		866,246	
48-00	Adjustments			(-6,951)	
	Equipment total	885,000		919,968	
51-00	Miscellaneous	14,350		13,152	
	Grand total	1,829,100	163	1,788,320	107.9

As can be seen, whilst the reduction in total is almost completely due to the adjustments ("Surrender PV Obligations"), some funds have been redistributed. The reduction in 11-06 is due to the fact that the former Quality Control Expert became the CTA and continues to assure his original functions. Other major changes are due to the addition of a forging/press die expert (11-08) and a revision of the periods of presence of 3 other experts.

Delivery of UNIDO inputs, as per Experts Work Plan

	Plan Oct.86 foreseen m/m	Planned to date m/m	Achieved m/m
CTA	48	30.8	30.8
Expert foundry	16	11	8
Expert documents	2	2	2
Expert materials specs.	4	4	4
Expert CAD/CAM	3	3	1.1
Expert quality	9	7	6
Expert general auto manufact.	11	7	7
Expert dies	9	6	0
Consultant	6	4	4
Total	108	74.8	62.9

It is seen that the latest Experts Work Plan (Oct. 1986) has not been respected. Progress since the initiation of the project has been as follows (expressed in m/m):

	Original plan	Revision (E) Feb.86	Revision (I) July 87	Realized 30 Oct. 87
1984	23			1.1
1985	31			9.9
1986	33	32		28
1987	17	40.8	36.8	24
1988	3	22	30	
1989		2.2	2.2	
	107	97 (+11=108)	69 (+39=108)	63

The problems in obtaining suitable experts have proved considerable since the initiation of the project, and, although there has been an acceleration in 1986 and 1987, the targets have not been met, and, if the absence of certain experts is either of no immediate consequence (CAD/CAM) or might be compensated for locally (quality, foundry), the absence of the expert in forging/press dies is a very serious handicap to the development of this service.

Experts with many years of practical experience in the automotive industry are required. UNIDO has met with great difficulty in identifying suitable experts acceptable to the Government of Pakistan and the VDTC management.

Training

Fellowships in m/m (and $)

	Original plan	Revision (E) Feb.86	Revision (I) July 87	Delivered*
1984	6 (12,600)			0
1985	18 (39,600)			0
1986	18 (39,600)	19 (44,650)		0
1987	12 (26,400)	18 (44,100)	(44,100)	0
1988		17 (43,350)	(58,000)	0
1989			(30,000)	0
Total	54 (118,200)	54 (132,100)	(132,100)	0

* One VDTC staff member is undergoing training in the U.K.

The major problems encountered with the implementation of the fellowship component include the following:

- Initially long delays on the part of Government in clearing candidates which now - the evaluation team has been told - are overcome;
- Problems in selecting candidates due to the difficulty VDTC has had in recruiting staff and related to that the difficulty in retaining staff;
- UNIDO has not been able to find suitable organizations willing and able to accept the trainees;
- In one case the VDTC candidate for training in jigs and fixtures was about to be placed in a foundry training centre;
- There is a need to ensure that VDTC staff are in place during the assignments of the international experts. This essential for the on-the-job training aspect of the project;
- In general, VDTC cannot release enough people for training and maintain continuity of services at VDTC to fully utilize the training budget by March 1989.

Study tours

The successive budgets have been as follows (in US$):

	Original plan	Revision (E) Feb.86	Revision (I) July 87	Expenditures
1984	15,000			
1985	15,000			722
1986	10,000	22,278		8,018
1987		12,000	19,000	
1988		5,000	12,260	
Total	40,000	39,278 (+722= 40,000)	31,260	8,740

The expenditure plans were postponed to take into consideration the difficulties in setting up the study tours outside Pakistan, which pose problems similar to those plaguing the fellowships.

Three nominees have completed study tours in Germany, Yugoslavia and the U.K. Two candidatures have been submitted to UNIDO.

Equipment

Total expendable and non-expendable equipment (US$)

	Original plan	Revision (E) Feb.86	Revision (I) July 87	Expenditures
1984	330,000			6,710
1985	330,000			492,814
1986	225,000	207,186		211,367
1987		139,000	147,000	
1988		48,340	36,159	
Total	885,000	394,526	183,159	710,891
		+499,524	+710,891	
		894,050	894,050	

The initial delay in spending the budgetted amount is due to the late arrival of the CTA whose advice was necessary to finalize the equipment requisition list.

The project staff had two major complaints about the implementation of the equipment component. One, the delay in learning about the status of the orders placed and two, in a few cases, the actual purchase price paid by UNIDO far exceeded the price quoted to the project when informal quotations were provided.

A reconciliation of the actual status of this budget component by UNIDO is urgently required by the project staff in order for them to be able to complete their final requisition list.

Other problems encountered in the implementation of this component include:

- Cancellation of spectrograph since it was subsequently considered to be non-essential piece of equipment and too costly;
- Problems of equipment reliability and difficulties in getting equipment serviced locally despite the presence of local agents;
- Several pieces of equipment did not work on arrival, a few had to be sent back to the manufacturers;
- Some pieces were incorrectly specified, i.e. fuel flow meter, taper test machine;
- One piece had commissioning problems, i.e. servotest actuater.

Government inputs

Counterpart personnel

Recently VDTC management has decided that the staffing policy should be changed. The objective is to reduce the number of staff at the very junior levels and in a few cases increase senior technical staff.

Five junior supervisors, three laboratory assistants, one draughtsman, one chemist and two attendants have been deleted, for a total of twelve to counterbalance this, four assistant manager posts have been established.

The present staffing situation is shown in the table below. Out of 32 staff authorized only 21 are in place. Four staff are under recruitment and five will be recruited during 1988.

In general a large number of key staff have not been recruited which has severely curtailed project performance. In addition, three senior staff who have benefitted from the project have left VDTC without having been replaced.

The VDTC management has been correctly quite strict in only accepting new staff who are qualified and have relevant experience. VDTC has had difficulty in attracting and holding such staff, however. The problem is one of salary and status VDTC is momentarily able to offer.

Vendor Development and Training Cell
Personnel

Designation	Revised Plan	Existing	Under recruitment	Proposed to be recruited in 1987-88
General Manager	1	1	-	-
Sr. Manager	1	-	-	1
Managers	5	2	1	2
Dy. Managers	4	3	-	-
Asst. Manager Adm.	1	1	-	-
Asst. Manager Tech.	5	2	3	-
Supervisors (JE)	5	3	1	1
Designer	2	1	-	1
Librarian	1	1	-	-
Steno-typist (JE)	3	3	-	-
Drivers	2	2	-	-
Peons	2	2	-	-
	32	21	5	5

NOTE: Three apprentice engineers are proposed to be recruited shortly. They will receive training for one year and, if found suitable, will be considered for absorption.

Facilities

The premises originally foreseen at Naya Daur Motors Ltd. were finally rented in neighbouring buildings vacated by the Mack Trucks Company.

These premises have proved adequate for the initial development of the Cell, but no longer correspond with the current and future needs. The absence of a suitable lecture hall for seminars and specialized courses is a serious handicap to the satisfactory development of the training function. A laboratory extension will soon be necessary, and adjoining space has been requested to house future equipment.

Although separate rooms for delicate and high-precision equipment have been or are being created, the Cell for the expensive hydraulic fatigue-testing rig has been delayed and has thus retarded its commissioning. Also improved dust proofing of the special rooms already created is required.

The Director of PACO advised the evaluation team and Cell management that there is a very real risk that VDTC may be asked to vacate the present rented premises. If this is confirmed, the opportunity must be taken to obtain the extra space described above and all other improvements which experience has shown to be necessary.

B. Implementation of activities

The original project document was approved in October 1983, with an estimated starting date of April 1984. The Project Director was appointed in January 1984, and recruitment started. Full implementation activity was delayed, however, by the late arrival of the first CTA in March 1985. On 20 February 1986, a mandatory project revision was approved, and in March 1987 the first CTA was replaced.

Progress in the building-up of the Cell organization has been slow due to some delays in the fielding of experts, the recruitment of counterpart personnel of suitable calibre, and the difficulty of holding them. Of five senior managers planned only two are in place.

The Cell has concentrated to a very large extent on testing, inspection and quality-control functions although in this context handicapped by delays in the acquisition of equipment and some of its inadequacies (e.g. breakdowns, incorrect specifications, commissioning problems, etc.). This activity can be considered to be well initiated and vendors are taking good advantage of the services offered.

The training schedule is very substantially late due to:

- Some initial delays in obtaining government approvals (although this problems has now been overcome);
- Delays in obtaining suitable training programmes from UNIDO and in realizing the fellowships and study tours. This situation continues;
- Lack of trainees of suitable calibre: of 23 technical personnel only 12 are currently in place, and it is known that some of these will be lost.

Only two specialized fee-paying courses (24 participants) and 10 short seminars (311 participants) have been held, mainly by international experts and consultants, but occasionally by the Cell counterparts when available. The space available at the present location imposes some limits to this activity.

The advisory and consultancy services have been mainly rendered by the CTA and visiting experts, only a few Cell counterparts have expertise to assure this function.. The value of the consultations as a training-tool has been largely lost due to the absence of counterparts. At present, the CTA provides specialist advice and counselling in testing and quality control and routine advice in other spheres. The response of vendors to the use of these services needs considerable improvement.

The present project approach in providing experts other than the CTA has been one of using short-term experts to provide consultancy services to industry resulting in not enough follow-up and on-the-job training to too few counterparts.

The Documentation Section is fully operational and well organized. 12 bulletins per year are published for a nominal fee (technical, abstracts, newsletter). The library has built up a sizeable collection of books (574), subscribes to 23 periodicals, has reproduced 83,000 photocopies of various publications and recorded 229 visits in 1987.

The Administration Section is also fully staffed, although the CTA is often employed on purely administrative functions at the expense of his availability for the development of the Cell's activities.

Co-operation between the national and international teams appears to be quite satisfactory, no serious problems having been reported.

To date, co-operation with external organizations, laboratories, technical institutes, universities, etc. has not been fully developed, due to preoccupation with the delays in the aforementioned aspects of institution-building.

Tripartite review meetings were held in December 1985 and December 1986. The Project Manager issues quarterly reports on the activities of the Cell and any progress made in the acquisition of equipment, staff or UNIDO inputs. These exposed many of the problems outlined hereabove, but little progress appears to have been made in the most critical areas.

Following a decision at a TPR meeting, a Project Advisory Committee was set up to advise the Cell on the services desired, propagating its activities and facilities, and generally helping to overcome problems, in addition to making recommendations to the Government regarding the indigenization of the industry. Two meetings have been held and are now scheduled to take place every six months.

The Advisory Committee is composed of VDTC senior management, prominent assembler industries and a selection of vendors for a total of fourteen members. However, only a few vendors have been attending the meeting.

III. PROJECT RESULTS AND ACHIEVEMENT OF OBJECTIVES

A. Outputs

Introduction

In accordance with the project revision signed on 20 February 1986 the project objective is the establishment of a Vendor Development and Training Cell (VDTC), within the Pakistan Automobile Corporation in Karachi. To carry out its mandate it was planned that six sections be established. The definition of the capacity and capabilities of each of this sections are contained in the outputs of the project. The following analysis attempts to describe the extent to which the six sections of VDTC have been developed.

The six sections are:

1. Administration
2. Documentation
3. Material Specifications
4. Foundry
5. Tool, Die and Manufacturing Process
6. Quality Assurance/Control

Administration Section

This group assures the following functions:

1. Management of the facility;
2. Maintenance of the facility;
3. Assistance to technical staff;
4. Development and administrative support for the conducting of seminars and courses.

The staff, comprised of 8 persons, is in place and providing the services to the VDTC staff as foreseen, although the section manager should delegate more of the administrative work to assure normal functioning if he is absent. The office space occupied and equipment appear adequate. Eight one day, one two-day and one fifteen-day seminars on a variety of technical subjects have been administered by the section and conducted by visiting experts, the CTA or the VDTC technical staff.

Only two fee-paying specialized courses have been organized, due to shortage of competent technical staff in the other sections. The courses were:

- Jig and fixture design (16 participants);
- Principles and techniques of measurement (8 participants).

The Administration Section is operating fairly well. The level of staffing is adequate, however, the quality of administrative support provided to the CTA and the General Manager could be improved to allow them to focus on their many substantive duties and responsibilities.

Documentation Section

This group is responsible for:

1. Building and maintaining a technical library;
2. Preparing drawings of components, assemblies and sub-assemblies (as requested by the technical staff);
3. Setting up and maintaining a list of vendors;
4. Setting up and maintaining a library of technical abstracts;
5. Maintaining catalogues of production equipment;
6. Implementing and maintaining a materials data bank.

The staffing plan for 6 personr has been reduced to 5 by the reduction of draughtsmen from 3 to 2. Currently, the group is composed of 4, and lacks the second draughtsman. The office space and equipment are normally adequate, although the reference-library activity is somewhat hampered by the need to use the room for training sessions.

The library is well established with 574 books on standards and technical subjects. 23 periodicals are received and the library has registered 229 visits for consultation of its documents in 1987.

Each month a bulletin is issued either in the form of a newsletter, summary of abstracts, and technical subjects circulations (about 250 copies). The technical staff from the other sections provide the necessary specialist data and the librarian assures its publication. In the past a nominal fee for

this service was charged. Recently the fee was substantially raised. It is hoped that the sharp increase of the subscription price will not prevent a wider dissemination of the publications particularly to the smaller vendors.

The demands on the sole draughtsman's time are currently limited, but will increase as the component testing laboratory work develops. In the meantime it is planned that he be initiated into computer aided design (CAD).

A list of vendors has been set up following a vendor assessment questionnaire circulated to potential and current suppliers, to which 254 replies were received. This activity will be pursued further by VDTC.

The production equipment catalogue library has been initiated and further information is regularly added.

Procedures for collecting, producing, classifying and storing standards, drawings, specifications and manufacturing data are being implemented, as also procedures for collection and classification of information relative to available manufacturing, facilities and their equipment, capacity, and capability.

The materials data bank was initiated by a visiting U.N. expert and his counterpart, both of whom have left the Cell. Information for the maintenance and further expansion of this source of information should be provided by the Materials Specification Section (see corresponding sub-section).

A computerized reference system is being developed. Efforts are being made to disseminate information on the services afforded by this section.

Generally this Documentation Section has made a very favourable impression, a very good beginning has been made. Its services are appreciated by industry, especially the VDTC bulletins and its reference library.

Materials Specification Section

The responsibilities of this section are as follows:

1. Material selection (an advisory role);

2. Establishing material specifications (Japanese - ISO - BSI - SAE, etc.);

3. Establishing equivalent materials;

4. Standardization;

5. Automotive component testing standards;

6. Materials finishing;

7. Heat treatment.

The staffing level foreseen was 4, reduced to 3 by the elimination of a Junior Supervisor (see Government Input section). Currently, problems of recruitment, loss of key personnel have led management to distribute the responsibilities of this group into other sections - notably Foundry which has the metallurgy specialist, but also to a lesser degree Quality Assurance and Documentation. This action makes the best use of the competence of the key personnel available, but does not appear rational in the long term, and will overburden the leader of the other section as the workload develops, probably at the expense of this important function.

The data bank cited in the preceding section will contain the information on items 1, 2, 3, 4, 6 and 7 and data continues to be collected. In addition, a list of the known materials available in the country, and raw material costs are being collected, as also data on item 5 above.

The precise manner in which these various responsibilities will be discharged has not been clarified, but it seems reasonable to suppose that the materials data bank will be housed in the Documentation Section, all the necessary information being provided by the metallurgist of the Foundry Section, whilst the Quality Assurance/Testing group will supposedly assure the establishment of the component testing standards.

It is hoped that the build up of the staff of VDTC will eventually permit management to revert to the project plan. In any event the Evaluation Team will make recommendations regarding the overall organization of the Cell.

Foundry Section

This group must assure the following functions:

1. Determining designs and methods for the casting of grey iron and precision parts;

2. Design of patterns and core-boxes;

3. Developing advanced casting techniques.

A staff of 4 was foreseen in the Project Revision of February 1986. The elimination of a Junior Supervisor as mentioned in the Government Inputs section of the present report has reduced this requirement to 3, of which the Deputy and Assistant Manager are actually in place. However, if the staff for the Materials Specification Section is included since currently the Foundry Section must assure the bulk of the functions of that group (see preceding sub-section), this makes a total of 6 required. Management, however, still foresees a total of 3 to be reached by 1988 and 1989.

This section has only one engineer today, with good metallurgy knowledge, but no practical experience of foundry work. He represents the only counterpart present during 8 months of U.N. expert input, and his loss to VDTC would nullify training efforts made in this direction to date. Furthermore, it is urgent that he be given further training in the form of fellowship or, failing this, service in one of the best foundries in Pakistan, to develop his practical experience.

The situation in this field is therefore critical. It is clear that additional high-calibre staff with sound practical experience are urgently required. Only in this way will the section be able to assure the services in the field of Foundry for which it was created.

This section has been active in providing trouble-shooting assistance to foundries. Over 111 visits were made by UNIDO experts together with the Deputy Manager and 48 follow-up visits were completed by the Deputy Manager. Over forty jobs were completed, and the jobs are on hand.

Again, the problem here is that, if the Deputy Manager leaves, any progress made in this area will have been nullified.

Tool, Die and Manufacturing Process Section

This group covers:

1. Assistance in tool design, manufacture and maintenance;
2. Assistance in die design, manufacture and maintenance;
3. Assistance in jig and fixture design, manufacture and maintenance;
4. Application and implementation of appropriate CAD/CAM technologies;
5. Product modification;
6. Assistance in machining process;
7. Design of inspection gauges and fixtures.

The original plan for staffing, as defined in the Project Revision of February 1986, foresaw 5 persons to be in place in 1987. Management wishes to reduce this to 2, explaining that the function of the section, being essentially advisory, does not require lower grade personnel and for this reason the Senior and Junior Supervisors and the Attendant could be eliminated. The actual strength is limited to one, the Manager, an engineer, who has little practical training in this field and since a suitable Expert in Forging/Press Dies has still not been fielded, and the fellowship plan for the one engineer not yet realized by UNIDO, there can be little development of activity as long as this situation is perpetuated, except to a limited extent to provide advice in categories 3, 6 and 7 above. Item 4 has been transferred to another section.

An Expert in General Automotive Manufacturing was fielded during seven months, involving key personnel from other sections in view of manpower shortages. Although this additional experience is valuable to the individuals concerned, the development of their own speciality has not taken place as planned.

Most of a course on the principles of jig and fixture design was prepared and presented by the visiting expert to 16 participants. It is doubtful that such a course can be repeated.

In spite of the foregoing, management claims that to date 90 individual consultancies have been provided involving 107 visits to plants. Clearly these must have been mostly provided by the CTA or the visiting experts.

Here again, as in the cases of the Foundry and Material Specifications sections, lack of progress in recruitment and training of counterpart staff are endangering the project. Solutions to both of these problems are urgently necessary and it is difficult to envisage these sections being in a position to fill their roles by March 1989. In the meantime, only limited services can be provided to vendors in dire need of advice in manufacturing technology in order to produce satisfactory quality.

Quality Assurance/Control Section

This section is responsible for:

1. Establishing quality control systems;
2. Inspection;
3. Testing of automotive components;
4. Quality control consultations with vendors;
5. Designing and developing testing equipment and local fabrication.

Here again, staffing is behind schedule. Of a total foreseen in the February 1986 Project Revision of 11, of which 8 by through 1987, 6 are now in place. Furthermore, as in the case of sections previously discussed, management wishes to revise requirements by eliminating 6 lower grade personnel and replacing them by 7 senior staff to bring the total to 12. The fellowship approved for the Deputy Manager awaits placement by UNIDO since June. The Evaluation Team is now informed that this man, the sole engineer with understanding of the more complex techniques used, is contemplating his resignation, thus revealing the extreme vulnerability of the service.

An expert in this speciality has been fielded for 6 months out of 9 planned and a Training Course in the Principles and Technology of Management was attended by 8 participants.

The acquisition of equipment has proceeded generally with satisfaction, with the exception of the cancellation of one item (spectrograph) considered

by the present CTA as unnecessary, and some confusion as to the exact amount of expenditure, since the equipment, delivered sometimes several months after requisition, may be invoiced at a price superior to the original quote, due to exchange rate fluctuations or inflation. VDTC is not kept informed with sufficient promptitude by UNIDO, the Evaluation team was told, and there is confusion over the exact amount left in the budget. Until this is known, management has suspended further acquisitioning.

In the meantime, however, an additional list of equipment wanted has been prepared which exceeds the budgetted amount by a sum estimated as $180,000 (pending confirmation of residual budget by UNIDO).

The register shows a list of nearly 300 tests and inspections made, and although some items of equipment have been totally idle, for various reasons (e.g. not functioning correctly, incorrectly specified, problems in commissionning, no test request received) some items have been subjected to intensive use whilst handicapped by breakdowns which the local agent proved unable to repair. A special controlled atmosphere cell is under much delayed construction to house the Servo-Hydraulic Testing Machine within the present space.

For the immediate future, the CTA recommends that the commissioning of all equipment be rapidly completed, and be devoted to practical training of the section's personnel, which will better prepare them for outside work in the long term. In the current situation, this seems to be a prudent step.

Additional space will be required for future extension to house new equipment and it is hoped to obtain the adjacent bay in the Mack Trucks building.

B. Achievement of the immediate objective

As demonstrated in the foregoing Outputs chapter, without some energetic change of policy with respect to recruitment and retention of key personnel, and an intensification of their training, achievement of the immediate objective within the time-frame foreseen is extremely remote.

The principle of VDTC has been adequately justified, evidenced by the use and appreciation, although limited, of the services provided to date to the

industry. However, although the existing organization has established some encouraging relations with a number of clients, unfortunately the vital consultancy aspect of the service has been mainly assured by visiting experts and the CTA and has certainly been much appreciated by vendors receiving advice. Their ability to train counterpart personnel, however, has been largely constrained by the lack of counterparts. The experts have contributed considerably to the courses and seminars conducted, however, only a few courses have been institutionalized.

Although good use is made of the Documentation Service, as shown by the calls for advice (particularly in the fields of foundry, machining and quality control, the requests for test and inspection services, and the attendance at courses and seminars), it cannot yet be claimed that clients will have great confidence in the indigenous organization until more competence is acquired development of the ability of the counterparts to provide comprehensive services to industry.

Nor can it be claimed to be as yet integrated into the national structure, due perhaps to its character as a branch of PACO. Beyond the automotive industry establishments visited the evaluation mission could not determine whether there was any particular awareness of the existence of VDTC.

The establishments visited by the evaluation team were selected because they had co-operated and/or benefited from VDTC services in a form or another. Although VDTC is still in its infancy, there is a need to establish more formal linkages with other institutions providing parallel and/or complementary services to industry. The VDTC is aware of this need and intend to systematically visit such institutions to assess their capability and to see whether more formalized co-operative arrangements can be established.

The future of the project, if it is to make an impact and spread its influence throughout the automotive industry in Pakistan, is dependent on the building-up of the permanent key personnel. It is clear that the difficulties in recruitment and retention of personnel cited several times in this report, were not foreseen. The nature of the VDTC Cell as a unit of the PACO organization having to respect its salary and status codes will not permit any improvement in this situation. The sustainability of even the modest achievements of the project are endangered.

In short, the attainment of the immediate objective of the project is dependent on a prompt satisfactory solution of these problems, after which VDTC should be able to look forward to a rapid expansion of its organization and spread of its influence.

The Evaluation Team believes that an extension of the time frame foreseen in the project will be unavoidable.

C. Contribution to the achievement of the development objective

In view of the fact that this is a mid-term evaluation and given the implementation delays encountered up to now it does not make much sense at this point to discuss the contribution the project has made toward the achievement of the development objective.

The team is able to confirm, however, that the VDTC once firmly established will make a significant contribution towards the development of the automotive industry in Pakistan. The team is also convinced that, even if Government adjusts its deletion policy downward to better reflect its ability to achieve Government targets in the near future, these will be a continuing need to help industry improve quality and productivity.

CHAPTER IV: CONCLUSIONS

The automotive industry

The automobile industry in Pakistan has gained momentum and there has been progressive development in manufacture of components for automotive vehicles both in public and private sector. Most of the components of these vehicles are developed by the ancillary industry which comprise mostly of small workshops. These Vendors cannot afford the sophisticated manufacturing equipment, resulting in considerable delays in developing and manufacture of these components to the required standards.

Vendors and assemblers are experiencing great difficulty, however, due to the policy of diversity of models (cars, trucks, tractors) and makes. The market has to be shared between these and numerous cars imported complete which results in such small quantities of each that it is usually difficult to justify investments. This is particularly evident in the case of "CKD" units which in effect are only "SKD", and will always inhibit the attainment of desired deletion targets within acceptable cost limit. It is understood that the Government has accepted this fact and is in the process of revising the targets, which will need to be lowered substantially if enormous investments are to be avoided.

It may be argued that some firms are already close to the deletion targets presently required, but doubts have been expressed by a majority of those interviewed by the mission as to the validity of such claims, and indeed, the experience of members of the mission tend to confirm these doubts.

An association of vendors should be encouraged to present the views, difficulties and recommendations of the industry to the authorities, to whom this information would be of great value in determining its policy.

Despite these constraints there exists great competence and ingenuity among the vendors, whether the facilities be sophisticated or primitive. However, the need for guidance and help, particularly in the field of quality control, which can be greatly afforded by VDTC, is apparent.

Project document

The project document, although considerably improved during 1986, did not fully specify outputs and project activities. This has certainly contributed

to a lack of clarity between project activity and the activities of the VDTC. This more than likely contributed to the overemphasis of using experts for direct support activities at the expanse of firmly establishing VDTC's capacity and capability.

Monitoring activity and project management was also made unnecessarily difficult.

For example, input delivery schedules have been prepared by project management. However, all activities required to be undertaken by project staff to produce each output were never prepared.

Delivery of inputs

Unusually severe delays have been encountered in delivering international and national inputs (experts, training, equipment, counterparts). UNIDO will need to improve its project backstopping performance. The Government of Pakistan has resolved some of their bottlenecks in approving experts and training placements. Closer co-operation between all parties involved is required.

The ability of VDTC to attract and retain qualified staff has placed the project in considerable danger. The sustainability of project achievement is in question.

Implementation of activities

Progress in building up the VDTC has been slow due to delays in the fielding of experts, the recruitment of counterpart personnel. Of five senior managers only two are in place.

Experts have been used too much to carry out direct support assistance to industry and have not been able to train an adequate number of counterparts and thereby establish a capability in VDTC to carry out consultancies.

The training schedule is very much delayed because of staff in availability, difficulty in locating training places, long government clearance procedures, etc.

Outputs

The Adminstration Section is operating satisfactorily. More support is required to facilitate project administration to free the National Project Director and CTA to focus on substantive tasks.

The Documentation Section is relatively well established with enough staff on hand to provide information support services.

Materials Specification Section

Progress in this output is far below expectations, and responsibilities have been distributed to other sections. This is an extremely important section and this section should be re-established as soon as possible.

Foundry Section

The situation in this section is precarious. Staff turnover can nullify any assistance provided by the project. Useful services to industry are at the moment being provided.

Tool, Die and Manufacturing Section

This section has also carried out a large number of consultancies mostly by international experts. Lack of progress in recruitment and training of counterpart staff has limited progress in establishing this section.

Quality assurance/control section

This service has been well established but has had problems in purchasing and commissioning equipment. The staff situation, although better than the other sections, is also vulnerable to staff turnover. In spite of this it must be stated that, within the limits of the staff and equipment, much excellent work has already been done in the fields of testing.

Direct support assistance vs. institution-building

Consultancies jobs conducted to date are: 1985 - 11 jobs, 1986 - 56, 1987 - 65 (to end September). While these numbers are well up to target the work was predominantly that of experts with little input from the VDTC personnel.

Only a few of the recommendations of the experts have been implemented by the vendors/assemblers. The learning opportunities for VDTC resulting from the experts consultancies have been minimal because of the lack of follow-up. Moreover, clients can have confidence in VDTC only if recommendations are implemented. This would require long-term expert support to VDTC staff in helping them implement the suggestions made to the manufacturers.

Achievement of the immediate objective

The project objective is far from being achieved and cannot be realized by the end of the project.

The need for a VDTC is adequately justified. The project, however, requires continued support from UNDP/UNIDO, Government of Pakistan and PACO to rapidly build on the foundation laid so far. The VDTC staff, the National Project Director and the CTA are very capable and have a clear perception of what is required.

Detailed recommendations are made in the following section which would, in the view of the evaluation team, allow this important project to succeed.

CHAPTER V: RECOMMENDATIONS

Introduction

The limited results obtained due to the problems encountered, and the enthusiasm shown by clients having benefited from the Centre's services both confirm the necessity for its existence and the wisdom of the project. Its development should therefore be encouraged and to this end an extension of the project to achieve the immediate objective is recommended. UNDP/UNIDO agreement to support a further development phase should be conditioned on tangible improvements before the end of the present phase. Eventually the organization will need to be further developed to assure a much wider range of services, especially in the field of testing and certification of complete units (engines, gear boxes, axles, hydraulics, etc.). This will involve considerable investment which could be recovered by charging appropriate fees or by industry participation.

The recommendations which follow have been made to guide UNDP, UNIDO, the Government of Pakistan, PACO and VDTC on the nature of actions required to improve project performance now and in the future.

1. To enlarge the pool of experts who could be recruited for the project UNIDO and VDTC should consider, where possible, to find experienced technical experts who have the required skills such as casting, jig and tool design, press tools, etc., but not necessarily having had practical experience in the automotive industry.

2. A similar approach could be considered when difficulties are encountered in placing fellows who require training in a particular technique or discipline.

3. To speed up fellowship placements and finalization of study tours, UNIDO should make every effort to research placement opportunities before the actual candidates have been identified and cleared by the Government. Close co-operation with the UNIDO Training Branch and project staff would be required if this approach is to succeed.

4. UNIDO must refer back to the project team when the price of equipment to be purchased substantially exceed the initial cost expectations. Moreover, more frequent communications from UNIDO to the project concerning the status of equipment purchase actions is required.

5. UNIDO should immediately send a reconciliation of the equipment budget expenditure status to the project.

6. Sophisticated equipment should not be purchased unless covered by adequate warranty protection and written assurance that local agents are able to provide servicing or, where this is not practical, that an alternative arrangement be negotiated to ensure that the equipment can be serviced.

7. In general, UNIDO backstopping needs to be improved considerably. The project is in a critical phase and needs far more advice from UNIDO than it has received in the past. A strong UNIDO representation at the January 1988 Tripartite Review will be required to reprogramme the project.

8. It is considered that the usefulness of the visiting experts could be greatly enhanced if they stay for a longer period instead of splitting up their total time into short stays. This would allow them to grasp better the technical problems in Pakistan, to stay with their trainees and follow their progress more effectively.

9. Less emphasis should be given in the experts' terms of reference to direct support assistance to the industry and more on training counterparts and institution building.

10. Experts must have at least two counterparts.

11. A training expert should be fielded by UNIDO to teach modern training techniques to the national staff engineers responsible for training, and in general strengthen the training function at VDTC.

12. To rationalize expertise already existing in Pakistan, VDTC's Director, in co-operation with the CTA, should allocate time from their busy schedules to visit organizations in Pakistan, both public and private, which could potentially help VDTC in carry out tests, provide complementary training resources and expertise in specialized areas. Opportunities for interorganizational co-operation should be formalized wherever possible.

13. Another policy to be considered is the establishment of an external consultancy budget which would enable VDTC to hire the best consultants available in the country (i.e. private industry, other PACO units, university,

other service centres, etc.) to provide specialized technical assistance to the industry. This is desirable because in many areas international level expertise exists in Pakistan but the mechanisms to provide this expertise where it is required is lacking.

For consultancy services provided by VDTC to larger companies fees should be charged and the proceeds should be used to replenish the consultancy budget.

14. A Project Advisory Committee (including vendors and assemblers) has been created at VDTC and could be of considerable value, but the results obtained do not appear to have been as effective as is desirable. Meetings should be more frequent, but more importantly, responsibility for effective action following them should be clearly defined and followed-up.

15. Materials specification should be re-established as soon as staffing levels permit. This could by part of a general reorganization programme as outlined later.

16. The project team has made an appeal for further equipment so that the VDTC can carry out all the tests the quality of the components without having to resort to the foreign principles. It was argued that further equipment is required to enable VDTC to make more specific suggestions to industry on manufacturing process and method changes required to meet standards.

A list of equipment desired was shown to the evaluation team. The team was not able to go through the list in detail, and in any case specialist knowledge is required to properly evaluate the items requested. It is recommended that the CTA, in co-operation with the Managing Director of VDTC, prepare a justification for each item of equipment desired. UNIDO should carefully review the list and provide their assessment.

The final equipment recommendations should in all cases complement existing equipment at VDTC and bear in mind equipment available in the country. Management should confirm that, if existing elsewhere, it could not be made available to VDTC clients.

17. VDTC can already provide many useful services to the vendor industry. To this end, great efforts are needed to promote and publicize the services offered by VDTC. The assemblers should enforce quality standards more

strictly and use their influence and position as customers to encourage vendors to make use of VDTC facilities and competence; this would be favoured by an increasing acceptance by the assemblers of VDTC inspection and quality control reports.

18. Vendors and other users of the centre's services should become members or subscribers, paying an annual fee - the details of which can be left to local management.

19. In view of the remoteness of the Lahore area, in which a considerable number of vendors are located and therefore difficult to service, an outpost should be created as soon as practicable in that region. A small staff could assure advisory services and liaison with Karachi and make use of any laboratory and testing services available locally.

20. A small VDTC pilot foundry should be created at Bolan Castings, a high-class modern foundry and a unit of the PACO group. This would act as a sub-centre, under the direction of a VDTC specialist, to develop casting techniques and train vendors, making use of the modern equipment available at the foundry. The Bolan Castings senior staff could also be used in a consultant role.

21. In order to solve the problems of status and salary within VDTC and thus facilitate recruitment of high calibre personnel, the centre should be made as independent as practicable from PACO. The aim must be to make it a centre of excellence, the focal point of information for the automotive industry, promoting the exchange of information, transfer of technology, and co-operation between sectors in addition to the functions already foreseen. To this end, a more appropriate, preferably resonant, title reflecting its national character should be created, such as "Pakistan Automotive Technology Centre".

22. The more autonomous VDTC organization should have a special salary and grade structure which will attract the best manpower available in Pakistan. The organizational structure and job descriptions should reflect that VDTC is a technical consultancy and testing centre. The top position of the new VDTC should be at the Director level. This person would be responsible for the management of the centre. Besides administration, training support and information services units there should be two Departments or Divisions. One providing technical consultancy services, the other providing a sophisticated

range of quality testing, inspection, certification, and analysis services to vendors and assemblers. These two departments should be headed by a General Manager level staff, who will be responsible for managing the services for which they are responsible under the supervision of the Director.

23. The resolution of the staffing problem at VDTC is a prior obligation for additional UNDP/UNIDO assistance beyond this project.

24. During the evaluation the possibility that VDTC may need to vacate its present location was discussed. This must be clarified immediately. The preparation of a new location and transfer of equipment and furniture and their installation might take at least 3 months, during which all laboratory activity will cease.

In any event, additional space to create a lecture theatre and a laboratory extension are urgently required, the present space being quite inadequate to house the testing, inspection and teaching facilities (current or foreseen).

The project activity plan needs to be adjusted as soon as a decision is taken, preferably before the Tripartite Review scheduled for January 1988.

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The recommendations and discussion above reflect that the project is entering into a transition phase which will require a change in implementation plans. Some suggestions are listed below.

25. VDTC should, with the CTA, arrange and conduct seminars on standardization, quality and testing in co-operation with and supported by selected national experts who have expertise in this area. Such experts are available at Allied Tractors, Atlas Autos, Pak Suzuki Motor Company, etc.

26. VDTC should further train its staff in analytical, problem-solving techniques using a selected sample of manufacturing units as case study examples. An approach to follow could be to:

(a) Improve manufacturing techniques and quality practices of a limited selection of co-operating manufacturing units for demonstration purposes.

In turn:

(b) The manufacturing units should make their manufacturing facilities available for on-the-job diagnostic and process improvement consultancy training.

27. During the transition phase new VDTC staff requiring experience should be seconded to model PACO production units to get practical hands-on experience of factory conditions, problems and constraints. The secondment should be structured and organized in close co-operation with the units providing the on-the-job training opportunity. In return, VDTC staff member being trained will be requested to prepare analytical reports under the supervision of VDTC management. These reports will contain recommendations on improvements which could be effected by the manufacturing unit providing on-the-job training.

28. A policy of rotating PACO's best staff through VDTC should be considered. The broad range of consulting assignments to various vendors and assemblers would provide such staff with the better insight into the problems of industry and at the same time they would gain experience in quality related technical and management systems to improve existing practices. Increased technical knowledge and problem solving ability would help groom staff for senior management positions in the various PACO production units.

29. The CTA and VDTC General Manager should undertake a study tour to visit two or three automotive industry research and service institutions in selected developed and developing countries, to gain a better understanding of their successes and problems. There may also be scope for establishing twinning or other co-operative arrangements.

A visit to the Suzuki plant and the Automotive Research Institute in India would be particularly fruitful, if this can be organized. A visit to appropriate institutions in Korea is also suggested.

During this study tour, visits should also be made to potential sources of supply for the expertise required for the project.

A one week stop-over in Vienna should be built into this study tour to better familiarize the CTA and the VDTC General Manager with the project support services available at UNIDO including the procedures they are required to follow. During their visit to UNIDO they should become familiar with the work of other sections active in supporting projects in related areas.

The visit to UNIDO should be used to reconcile VDTC's budget records with UNIDO's.

30. It is recommended that a UNDP/UNIDO expert be appointed and located at the Ministry of Production, to oversee and co-ordinate all policies concerning the automotive industry. To liaise with the Government on policies concerning deletion levels and their compatibility with diversity of products, low volumes, investments, facilities available, raw materials, facilities accorded to importers of complete competitive vehicles, etc. He would also follow-up with Government recommendations made at the Project Advisory Committee at VDTC.

31. Finally, in approximately one year time UNDP and UNIDO should field a mission to assess progress made to implementing the above recommendations and to formulate a second phase project if this is merited.

CHAPTER VI: LESSONS LEARNED

- Early identification of severe project implementation trouble could be greatly facilitated, if the project document is fully defined in compliance with UNDP/UNIDO policy and procedures.

- Mid-term evaluations should be more frequently conducted for projects with substantial implementation delays. Often project design problems and external factors prevent timely implementation. Mid-term evaluations can help identify obstacles and catalyze effective action to get around them before it is too late.

- At the outset of the project it should be understood that industrial research and service have to be able to attract staff more competent than those working in the industrial production units requiring assistance.

- In most developing countries reside highly qualified nationals capable of providing international level consultancy assistance to local industry, but do not find the means to do so. Industrial research and service institutions should develop mechanisms to facilitate the provision of such services to where they are required.

- Testing and information services to industry is a good starting point in developing an industrial research and service institution.

- Industrial Research and Service Institutions can already at an early stage play a catalytic role in organizing seminars, conferences, lectures and generally provide a forum for industry to discuss mutual problems and decide on actions which could be undertaken to solve them.

- Industrial Research and Service Institutions should be closely linked with an association of the industry it is supposed to serve. If one does not exist, the IRSI should promote its establishment.

Annex I

TERMS OF REFERENCE

Joint Evaluation mission of the UNDP/UNIDO Project DP/PAK/83/014 - Assistance to Pakistan Automobile Corporation Ltd. (VDTC).

Background to Evaluation

1. The immediate objective of the project is to establish the Vendor Development and Training Cell in a Pakistan Automobile Corporation unit in Karachi to provide technical advisory services, automotive component testing and technical training to vendors of the automotive industry. The setting of the project at its inception was one of projected expansion of the market for automotive products in Pakistan, and the aim of achieving 80% indigenous production of components by 1989 as against the then current level of 20-60% on different vehicle models. It was expected that the assistance to vendors to be provided by VDTC would stimulate the private sector and provide additional working opportunities. There was also evidence that the quality of locally made components was often below the required standard, and that it was time "to give quality and precision its long awaited consideration".

2. The project was signed in October, 1983 and commenced effectively on the arrival of the original CTA, Dr. Momir Mrdovic in March, 1985.

3. A joint in-depth evaluation of the project is scheduled for August 1987, to analyse whether the project design is compatible with the achievements of the project so far, in order to permit the reformulation of objectives and activities if considered necessary to the achievement of concrete and realistic results at completion of project activites, scheduled for March 1989.

4. The evaluation of this project should also include an analysis of the current situation regarding transport machinery demand as covered by the Capital Goods Project DP/PAK/76/003 and the Industrial Planning and Statistics Project DP/PAK/79/002. The results of the Capital Goods project were to constitute a basic input to this project.

5. The findings of the evaluation mission should be utilised by the Government, UNDP and UNIDO for the purposes explained below:

Purpose and Methods

6. The primary purposes of the review of the project are:

- to evaluate it in order to determine how adequately its immediate purposes are being attained and how effective it has been or is likely to be in helping the Government to achieve the relevant sectoral and/or national development objectives.

- to identify the factors which may have facilitated or deterred the achievement of the project's immediate purposes and ultimate objectives; and
- to make recommendations for future action.

The Mission should feel free to review all steps in the formulation and implementation of the project and make recommendations as to its future.

7. In carrying out these purposes, the mission will in particular:

a) Consider the effect on the Immediate Objective of changes in currency rates of exchange and inflation since October 1983, particularly on the limitations to the required facilities which will result.

b) Consider the capability of the national staff to acquire within the remaining period of the project the necessary in-depth knowledge to provide consultancy in the fields of expertise given in section E2 of the project document.

c) Consider the potential effectiveness of the project in promoting the Government's national development objectives in view of the financial retraints on vendors resulting from the proliferation of vehicle models and the limited model life of some vehicles.

d) Consider how the effectiveness of the project might be enhanced through greater cooperation between the Government and licensors leading eventually to approval of VDTC as a Product Acceptance Authority, thereby reducing the need to submit components to licensors for approval.

e) Consider what complementary services have become available locally which need not be duplicated in this project.

f) Analyse the effectiveness of the utilisation of experts.

g) Analyse the present situation of cooperation between VDTC, Technical Institutes, Universities and national bodies dealing with metrology, metallurgy, rubber and plastics technology, manufacturing technology, and quality assurance.

h) Assess the extent of Government participation relative to the commitments given in the project document.

j) Consider any other relevant factors.

8. The evaluation mission should prepare a report containing their findings and recommendations on the above points.

Composition of the mission

9. The mission will be composed of the following international staff:

T.B.E. - UNDP Consultant, Mission Leader
T.B.E. - Evaluation Section, Vienna

10. The Government of Pakistan is invited to associate itself with the mission's work, and appoint a representative to the mission team in order to facilitate the tripartite nature of the evaluation.

Timetable and Itinerary of the mission

11. It is suggested that certain background information can be obtained by the leader of the mission prior to the mission, such as that related to project DP/PAK/79/002, also whatever current update information may be available to establish whether the prescribed project input should be revised to reflect industrial performance. Otherwise the major effort will be at VDTC in Karachi and the end users.

A worthwhile addition would be to visit other organisations in the locality which can offer complementary services including PMTF, National Standards Institute, NED University of Engineering, Pakistan Shipbuilders, Messrs. Allwin Engineering etc.

Precise timing cannot be laid down, but it is anticipated that the mission's work will take ten days minimum excluding report preparation.

Consultations in the field

12. The mission will maintain close liaison with the UNDP Resident Representative in Pakistan, the concerned agencies of Government, the National Project Director, Chief Technical Adviser and other members of the international team of experts, the counterpart staff assigned to the project, as well as UNIDO's field staff in the country.

13. Although the mission should feel free to discuss with the authorities concerned anything relevant to its assignment, it is not authorised to make any commitments on behalf of the UNDP or UNIDO.

Report of the Mission

14. The leader of the mission will be responsible for finalizing, editing and reproduction of the report within one month of completion of the mission.

15. The report should be completed in draft form in the field, so that there is an opportunity for additional consultations as may be necessary. It should be submitted in its final form (not in draft) simultaneously to UNDP and UNIDO. The UNDP and UNIDO, by agreement, will submit the report to the Government.

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Annex II

LIST OF PERSONS MET

VENDOR DEVELOPMENT AND TRAINING CELL (VDTC)

Brig. M.A. Faruqui, General Manager
Dr. A.R. Qureshi, Tool and Die, Manager
Mr. Afaque, Deputy Manager, Testing
Mr. Khatry, Deputy Manager, Productivity
Mr. Mazhir, Manager, Documentation
Mr. Javed, Librarian
Mr. Goher, Jr. Eng., Metrology
Mr. M. Sajjad, Jr. Eng., Testing
Mr. Akhter, Jr. Eng., Design
Mr. P. Winter, Chief Technical Adviser

PAKISTAN AUTOMOBILE CORPORATION

Mr. Kanwar Idries, Chairman

PAKISTAN STANDARD INSTITUTE

Dr. M. Asad Hasan, Director

CENTRAL TESTING LABORATORIES

Mr. S. Ali Bagar, Director

GHAFCO INDUSTRIES

Mr. Mahmood Ashraf Khan, Chief Executive

NAYAR DAUR MOTORS (PVT) LTD

Mr. Shujauddin, Managing Director
Mr. T.A. Khan, Manager, Production, Tool and Die

ALWIN ENGINEERING

Mr. M. Aslam Khan, Manager, Industrial Engineering

HUSSEIN ENGINEERING WORKS LTD

Mr. Shehzad Iqbal Choudhry, Managing Director

AGRIAUTO INDUSTRIES LTD

Mr. Ahmed E. Garda, General Manager, Production

NATIONAL MOTORS LTD, PACO

Mr. Azhar I. Jaffery, Managing Director
Mr. Sanaul Haque, Senior Manager, technical

ADVISORY COMMITTEE

Mr. Tasadduq Amin Khan, General Manager, Production,
Tool and Die, Nayar Daur
Mr. Kamal Shahryar, Manager (Planning and Projects), PACO
Mr. Sardar Akhtar Khan, Senior Manager, Development, Atlas Autos Ltd.

BOLAN CASTING LTD

Dr. Syed Aftab Ahmad, General Manager, Production

BELA ENGINEERS

Mr. Ramyan Ali Khwaja, General Manager, Production
Mr. Shakir Wasti, Procurement Manager
Mr. Raja Sabri Khan

PAK SUZUKI

Mr. Faroukh C. Vachha, General Manager
Manager, Quality

ALLIED TRACTORS LTD

Mr. Anis Ur Rehman, Production Manager
Mr. Raja Sabri Khan, Manager, Quality Control

ALSONS INDUSTRIES (PVT) LTD

Mr. A.R. Allana, Managing Director
Engr. Ashfaq A. Paracha, Production Manager

PERVEZ ENGINEERING INDUSTRIES

Mr. Khalid Parwez, Proprietor

TARIQ ENGINEERING LTD

Mr. Abdur-Rehman, Managing Director

AL-ASAD ENGINEERING WORKS LTD

Mr. Syed Habeeb, General Manager

UNDP

Mr. B. Vunibobo, Resident Representative