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ASSISTANCE TO THE BANGLADESH DIESEL PLANT

DP/BGD/84/037

BANGLADESH

Technical report: Preparatory Assistance Mission*

Prepared for the Government of Bangladesh
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

Based on the work of Thomas W. Petrisz, Industrial Economist,
and Walter A. Kraehler, Mechanical Engineer, Diesel Engine Adviser

United Nations Industrial Development Organization
Vienna

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II EXPLANATORY NOTES

A. Rate of Exchange during period of mission

1 US Dollar = 30,9 Taka

B. Unusual Abreviations

BADC:	Bangladesh Agricultural Development Corporation
BDP:	Bangladesh Diesel Plant
BMTF:	Bangladesh Machine Tool Factory
BSEC:	Bangladesh Steel and Engineering Company
ERD:	External Resources Division
DBL:	Deutz Bangladesh Limited
DPD:	Draft Project Document
KHD AG:	Kloeckner Humboldt Deutz AG; Federal Republic of Germany

III ABSTRACT

Title of Project: Assistance to the Bangladesh Diesel Plant
Number of Project: BGD/34/037/A/01/37

The preparatory assistance mission was undertaken jointly by Dr. Thomas Vietorisz (12th till 18th April) and Mr. Walter A. Krachler (12th till 26th April) in Bangladesh with additional briefing and debriefing periods in New York and Vienna.

The findings with respect to the main objectives of the mission were:

1.) The demand on Diesel Engine taken from existing market studies exceeds by far the capacity of BDP in number as well as types of engines.

2.) BDP was found very viable and the grant of technical assistance is recommended to:

- increase the locally produced parts of the two- and three-cylinder diesel engines

- to increase the range of production to four- and six-cylinder diesel engines of the same family

- to introduce the production of pump units, marine drive units and generator sets

3.) Since KHD AG provides the necessary licence know how and documentation for the engine families under production at present and was also directly concerned with the planning, erection and putting into operation of BDP it is practically necessary that KHD AG should be the beneficiary of the proposed subcontract.

4.) Means have to be provided to ensure economic loading of BDP (placing of reasonable orders by government or government agencies, providing sufficient working capital, reasonable tax protection and/or exemption)

With this finding the TAPP was corrected and amended.

IV INTRODUCTION

BDP was established in 1966 as a state owned company on the basis of an agreement concluded between the government and KHD AG. The present main direction of activities of BDP is manufacture of Diesel Engines and spare parts. The project was financed with loans granted by the government of the federal republic of germany through KWF. The multilaterial agreement for execution of the project expired 1982. Despite this KHD AG continued to provide a basic staff of experts for the continuation of training and production.

In Mai 1984 the government of Bangladesh requested UNDP/ UNIDO technical assistance for BDP. In due course a draft project document was elaborated and submitted to the government and UNDP Headquarters for consideration. Meanwhile additional issues arose which needed clarifications.
This UNDP/ UNIDO Preparatory assistance mission was sent to arrange for the final evaluation of the governments requests for technical assistance, with the main objectives:

- evaluate the demand for various types of diesel engines the basis of existing marketing studies

- assess actual technical assistance requirements of BDP

- suggest new developments in BDP for improving the range and quality of BDP's production

- assess the governments policy with respect to the import of finished diesel engines and components or raw materials for diesel engines to be produced locally.

V RECOMANDATIONS

In order to assure smooth and continuous development of the technical assistance project it is necessary to provide additional support and activities not specifically mentioned or stated in the draft project document.

1 If possible at all the present team of experts in BDP should be taken over in their respective function i.e. Mr. Stall as Chief Technical Adviser/Technical Manager and Mr. Hans and Mr. Schütz in their respective function as production quality control engineer and maintenance engineer.

2 The government should provide a basic loading of BDP by placing orders for a reasonable fraction of the local yearly demand at BDP.

3 Arrangement of an sufficient working capital by the government for prefinancing a reasonable production.

4 Measures have to be taken by the government to protect and support the local diesel engine production either by reasonable Tax protection for finished diesel engines and/or exemption for raw materials and high technologie-assessories to be imported i.e. injection pumps, pistons, bearings etc.

5 Kloeckner Humboldt-Deutz AG should be the beneficiary of the proposed sub-contract.

6 The percent of locally produced parts of two and three-cylinder engines should be gradually encreased to more than 70 percent.

7 The range of the production of diesel engines should be encreased to the four and six-cylinder engines of the same family with an percentage of locally produced parts of at least 42.

8 Extension of the line of production to diesel engine-pump units, diesel engine-marine drive-units and diesel engine-generator sets.

9 Building up of BDP as an demonstration project and subsequently spreading of technical know how during cooperation with other local companies.

10 Extension of the cooperation with BMTF for utilising their capacity and subsequently to other local companies.

VI BODY OF THE REPORT

The preparatory assistance mission was undertaken jointly in Bangladesh by Dr. Thomas Vietorisz, UNDP, Team Leader, (12th till 18th April) and Mr. Walter Krachler, UNIDO, (12th till 26th) April, 1985) with additional briefing and debriefing periods at UNDP Headquarters in New York and UNIDO Headquarters in Vienna.

A. General

Under the terms of reference of the Mission, a number of issues connected with the project were to be cleared up, as reported upon below; and if the project was going to be found viable, an amended Project Document was to be prepared. An abreviated itinerary of the acitivities is given in Annex 3.

B. Output of Activities

The Mission found that the project was not only viable, but was of high quality. The Bangladesh Diesel Plan, under technical assistance rendered previously by the Government of the Federal Republic of Germany and KHD AG, has attained a high quality of final product, and adequate costs of production to serve as the basis of further improvements. Owing to a number of special circumstances, the support and protection received by BDP from the Government of Bangladesh has not always been adequate and the plant has had to struggle with an international tender system for procurement orders by other Government dependencies, and has had inadequate working capital. In spite of these handicaps, the plant has been able to sustain its activities, win tenders and steadily improve its production and maintenance techniques and its product quality.

In the judgment of the Mission, it merits technical assistance support, and may in fact serve as a demonstration project whose standards of operation might deserve being transmitted gradually to other engineering industries operating in Bangladesh. Under the acitivities proposed in this report, such a demonstration effect could be readily attained.

Given this positive judgment of the overall performance of BDP and the worth while nature of the proposed technical assistance project, the Mission, under its terms of reference, amended the Project Document. The details of the proposed changes, spelled out in Annex 1, have been discussed and cleared with the respective Government agencies and with top management of the BDP and of the Bandladesh Steel and Engineering Corporation, the parent company of BDP.

The specific issues raised by the Preparatory Assistance Mission are addressed below.

1 Substantiation of the requirementes outlined in the new draft project document

The key requirement included in this document is the continuation of three experts now working in BDP who had been supported earlier out of German technical assistance funds. Since 1933 these funds have been exhausted and the experts have been continued under an agreement with the Government of Bangladesh that reimbursement would be provided for their services to KHD AG, the German Diesel manufacturing firm that had provided their services under the technical assistance effort.
It is the judgment of the Mission that this team has done an excellent job under highly exacting circumstances.

Mr. Stall, the Team Leader, has in particular shown himself not only to be a first-class technical expert, but what is more rare, has been able to show sensitivity to the particular cultural characteristics of the labor force in the plant that has enabled him to get a high level of performance out of both workers and locally hired engineers.

The Mission found further that the Project Document is lacking details in spelling out the work programme of the project over its duration. In the course of the stay of the Mission in Dhaka and during preparation of the technical Report, a much more detailed draft of individual sub-acivities, their scheduling over the duration of the project, and their mutual interrelations with respect to timing, has been prepared. This is being attached to the Draft Project Document as an Annex, and will provide a better basis for the detailed work plan that is to be defined during the initial period of the project by the CTA/TM, the BDP project Manager, and project consultants.

Other resource requirements, especially machinery and equipment to be used in training acitivities, have also been chekked in detail by the Mission and an appropriate list was prepared as an Annex to the DPD.
In addition, the Mission suggested the inclusion of computer equipment among project resources, since the rationalization of production, inventories, and financial accounting, contemplated by the project, would otherwise not be possible.

2 Need for further clarification of the need in Bangladesh for Diesel engines of various sizes

Indeed there is a need for such clarification, especially since demand has apparently fluctuated quite strongly in the period after Bangladesh came into existence. Previously, larger engines, with two or more cylinders, were dominant.

With the populist wave and aid to small farmers following establishment of the new state, one-cylinder engines came to be in great demand. Lately, Government policy and social trends both appear to favor cooperative arrangements among groups of farmers who individually could not afford irrigation equipment. This changed the profile of demand back in the direction of multi-cylinder engines with higher power output.

A demand study, included in the outputs of the amended DPD, requires both a thorough familiarity with local conditions, and an appraisial of crossnational experience. For this reason, as well as to satisfy the Government's request for the Inclusion of some local expertise in the project, the market study has been assigned to two experts, one local and one to be recruitment by UNIDO internationally.

3 National market and foreign suppliers

In terms of the appraisal of the project, the significance of precise demand projections is dwarfed by the problem of invasion of the national market by foreign suppliers, -- at times with no effective protection or even a negative rate of effective protection (owing to taxes and tariffs on local raw materials and other inputs) of local producers such as BDP.

WE RECOMMEND THAT IF AT ALL POSSIBLE, THE GOVERNMENT BE URGED TO GUARANTEE SOME REASONABLE FRACTION OF LOCAL DEMAND -- PERHAPS 10 to 15 THOUSAND UNITS PER YEAR -- FOR LOCAL PRODUCERS.

Procurement of key Government agencies under international tenders -- which give no local preference in many cases -- is a cancer on the developing industry, caused in part by the interests of international aid donors, but also reinforced in considerable part by local import interests.

4 Why Kloeckner-Humboldt-Deutz should be the beneficiaries of the proposed major subcontract under the project

The Mission concurs with the designation of KHD AG as the subcontractor. Fundamental to this concurrence is the principle that "if it works don't fix it". Under the conditions of severe underdevelopment and the cultural peculiarities prevailing in Bangladesh, it is difficult for technical assistance to attain meaningful results. The Mission has heard many cases of international experts whose efforts in Bangladesh have not worked out. The BDP project is running very well. It would be a pity to mess it up.

Subsidiary reasons include the enormous loss of time if production were changed form KHD AG technical specifications to those of another metropolitan manufacturer. If a different consulting group were called in to continue working with KHD AG specifications, they would first have to learn the particular technologies, with a loss of time and most likely, a loss of efficiency. In addition, KHD AG has a significant stake in the success of BDP, and can be held accountable by the Government of Bangladesh in a way that a consulting group unattached to an ongoing manufacturing venture could not be. Also that KHD AG is continuing its support to BDP dispite not having received any royalty payments up till now is manifesting the interest KHD AG takes in BDP. All this argues in favor of continuing with the KHD AG group.

In some quarters, opinions were profferred to the effect that KHD engages in predatory pricing on imported components, and appropriates the lion's share of the benefits of the manufacturing operation. The Mission is well aware that such practices are not unknown among transnational corporations. Yet, it is apparent that KHD AG is incurring significant costs in maintaining its operations connected with BDP.

Primary information concerning a price comparison between bid price on a Bangladesh tender, and commercial pricing of the identical Diesel engine in Austria, makes the Mission highly dubious about the merit of attributing predatory pricing to KHD.

Since this issue is inherently difficult to document one way or the other (since intracompany transfer pricing does not take place in the open) it is suggested that the best way of bringing this issue to an all-round satisfactory conclusion is to set out clear objectives for the percent of nationally produced components in the final product. In the deatiled acitivity listing, the average percent of domestic manufacture is being spelled out as an objective of manufacturing progress, year by year. An initial tentative set of targets, to be confirmed by more detailed technical work during the initial months of the project, is the following: average domestic components to increase to 50 percent after one year, to 62 percent after two year, and to 73 percent by the end of the project.

Attainment of these objectives depends in part on obtaining selected components from the Bangladesh Machine Tool Factory whose plant is adjacent to BDP and which forms part of the same industrial group as BDP. There is agreement in principle, following meetings of the Mission with top management of the Bangladesh Machine Tool Factory and of the Bangladesh Steel and Engineering Corporation, the parent company of both the latter firm and of BDP, that the project will extend its technical assistance acitivities to encompass the production of components for Diesel engines by the Bangladesh Machine Tool Factory whose capacity is under-utilized.

This extension of the compass of technical assistance from BDP to its suppliers, such as the Bangladesh Machine Tool Factory, is one way in which a highly successful demonstation project can act as a catalyst of development for the engineering sector as a whole.

5 Protection of national products

Since the Government allows the import of large numbers of finished Diesel engines from abroad, more information is required on how the Government will protect the products of BDP against cheaper imports. This issue has been touched upon before. The Diesel engine imports are generated by pressures emanating both from international donor agencies that wish to see their funds used under international tenders, and by bilateral donors that wish to increase the outlets for the products of their own industries. These external pressures are reinforced and abetted by domestic import interests.

The Mission urges UNIDO and the UNDP to exert all possible polite pressure to strengthen the hand of those forces within the Government that wish to promote the development of domestic engineering industries. Tariffs -- at a suggested 20-25 percent level -- would be helpful, though only in regards to the non-governmental part of demand, as various government agencies procuring under tender make their comparisons net of tariffs. Bans on the import of certain kinds of products are difficult to enforce. In principle, the planning agency and the Ministry of Industry can veto imports of domestically produced productes, but in practice enforcement of this principle has been unsatisfactory.

We suggest two measures:
First, the Government could greatly help BDP by a loan guarantee of a major working capital loan, since the plant now depends on successful tender bids to obtain financing for specific production runs -- an extremely poor way of running an organized, effective production process.
Second, the Government should be asked to guarantee BDP annual orders of at least 8,000 cylinders of Diesel engine products.

It must be recognized that a key force underlying the present unsatisfactory situation is the extremely limited ability of this society to generate savings. Thus, there are inadequate domestic financial resources to purchase the potential output of domestically produced capital goods. Yet, foreign aid seldom comes in completely fungible form, and thus the tied aid competes with comestic capital goods industries. This problem, affecting the entire capital goods industry, can be solved only gradually. Yet, in the meantime, the concentration of available resources for taking action, is justified in favor of particular producing units that can serve as demonstration projects for high-level performance with regards to cost and quality, for the entire engineering industry.

Thus, it is suggested that the Government be urged, in the short run, to concentrate its assistance on BDP as a highly efficient demonstration unit, while gradually making progress, in the longer run, in solving the problem of the engineering industry as a whole.

6 Government policy on the issue of after sales service

No full clarification was attained in this regard. It is, however, known that the government is moving from rental of pumping units to sale of the same on credit, where the farmer who purchases the unit becomes responsible for purchasing after-sale service. Together with this tendency, there is an encouragement for groups of farmers to buy larger-scale equpment rather than providing small one-cylinder units to indivitual farmers. The policy to be followed in moving from one system to the other remains to be fully clarified in practice. The project component dealing with after-sale service has, in the meantime, been strengthened.

C Additional Comments

1. Arrangement of yearly leaves

In recruitment international experts, it is suggested that their leave be contractually concentrated into the Ramandan periods of the project years. During these periods production inevitably suffers a drastic fall, and the absence of experts is not critical. These experts should, however, be on hand when production is in full swing.

2 Follow up of the project development

It is suggested that two consultants with backgrounds comparable to the personnel of the present Mission -- that is, a Diesel engineer and an industrial economist -- should be assigned to the project for a total of 8 man-months over the duration of the project. The purpose of four yearly three-to-four-week visits by these consultants would be project planning and ongoing technical evaluation. Since the project is suggested as a demonstration project, its proper planning and management is crucial. The consultants should be present during the initial planning period immediately after project start when the detailed work programme and acitivity timing for the project is being worked out, and at one-year intervals thereafter, for revision and technical evaluation of project objectives, management, and progress.

3 Improvement on cooperation

The tie-in between the project and other engineering industry activities which are connected to it by forward and backward linkages is critical.

Therefor the technical and management issues connected with progress in the direction of more effective cooperation among BDP and other engineering industries, both within the Bangladesh Steel and Engineering Company group, and outside it, have to be improved.

Initial efforts, included in the preliminary work programme, pertain to matched Dieselengine-pump units, small-vessel Marine drive units, as stand-by engines for sailboats plying inland and coastal waterways; trucks and matched Dieselengine-generator sets are foreseen in the draft project document.

4 Possible targets for future development

Additional areas of linkages where new technical assistance projects might be generated in the engineering industries, include: original modern sailing vessel designs with auxiliary engines; Diesel engine technical adaptation for (a) natural gas fuel, and (b) drastically lowered maintenance requirements when running on dirty fuel, dirty oil, etc. under primitive conditions; gear and gearbox manufacture for marine and highway propulsion and refitting of busses und trucks with BDP-engines. In addition, it is suggested that the monitoring of a forthcoming study of the sector as a whole, to be undertaken by another international organization, would be important, given the crucial constribution this sector has to make to the development of the country as a whole.

5 Project document

The sitation of the project document at present is somewhat peculiare for the following reason: the original project document agreed upon by UNDP was changed by the Bangladesh Government without contacting UNDP and/or UNIDO.

The major changes are:

- UNDP input were increased to 2,336,860,-- US Dollars due mainly to a considerabling increase on delivery of equipment

- the CTA was omitted and his function was assigned to the General Manager of BDP

- this procedure was no only unusual but created a situation not quite acceptable for UNDP: UNDP has to have direct access to the man in control of the project execution, therefore the CTA is inexpendibel.

To make use of the fact that the Bangladesh Government has already signed a project document the mission tried to arrange the necessary changes as amendments to the project document but there would be so many contradictions between the body of the project document and the amendments that there was no way arround but to prepare a new draft project document containing all the changes and amendments according to the findings of the mission.

The major points of this changes and amendments are:

- the UNDP inputs where increased to 2,772.400,-- US Dollar

- a local adviser for marketing management and one local adviser for financal management have been added to be hired under a local subcontract

- a computersystem with two personnel computers with a storage capacity of 512 kbyte each with Harddisk, Laserprinter, monitors, and standard software where included.

The range of acitivity of the adviser in financal management was increased to financal management and computer-software.

- the periods of the experts: CTA/TM, adviser on marketing management, adviser on financal management and computer-software production quality control engineer, mainentance engineer, product chief designer, expert on specialised services and the subadviser for after-sales-services where considerably increased

- the output for training equipment was increased to 362.300,-- US Dollars

- to ensure smooth development of the project two consultants (an industrial economist and a mechanical engineer/diesel engine adviser) were added for evluation and planning during the starting period and for yearly evaluation and revision of the projects imidiate objectives.

A detail to listing of the changes and amendments is stated in Annex 1.

A jobdescription of the CTA/TM was included under Annex 2.

Annex 1

List of Changes and Amendments to the Original Project Document

The following changes and amendments compared with the original project document have been included into the draft project document:

- On the titel page the UNDP inputs have been increased to 2,772.400,-- US Dollars.
- Under clause Part II.D "Background and justification", Para 6: The reference to the Role of DPL in the development of BDP was omitted.

- at the end of the clause headed "Justification" the introduction of computerrised cost keeping, stockcontrol and production optimization and the improvement of the cooperation within the BSEC-familiy and other public or privat enterprises is requested

- at clause "Part II.E-Outputs" the following amendments and changes have been made:

  - at para 1 the future updateing of the mastersurvey by an agreed methodology has been added
  - at para 2 the introduction of computer aided production optimization has been added
  - at para 3 the translation of the manuals into Bangla has been added
  - at para 4 the introduction of a computer aided cost keeping system and the translation of the manual into Bangla has been added
  - at para 6 the creation of a field maintenance manual in Bangla presented with comic's types pictures for easy understanding has been added
  - a new para 7 for the improvement of the forward and backward linkeages with other enterprises was added

- a new para 8 for regularizing product standards and the production rate of BDP has been added

- at clause "Part II.F-Acitivities" the assistance of the two consultants have been added and the objectives have been specified in more detail. A formal revision and reevaluation schedule every year was added.
  The annex C, preliminary time tables of main activities for the experts, was introduced, too.

- at clause "Part II.G-Inputs" the following changes and amendmentments were introduced:

  - at para 1 "Government" to the counterparts staff a financial management officer and a marketing management officer have been added
  - at para 2 "UNDP inputs" the following changes were introduced:

    - the project manager was changed to chief technical adviser/technical manager and his periode increased to 45 m/m
    - the period of the adviser in marketing management was increased to 18 m/m
    - the adviser in financial management was change to adviser in financial management and computer software and the duration of his period was increased to 42 m/m
    - an industrial economist and a mechanical engineer/ diesel engine adviser each with a periode of 4 m/m have been added
    - the period of the production quality control engineer was increased to 42 m/m
    - the period of the maintenance engineer was increased to 42 m/m

- the period of the product chief designer was increased to 42 m/m
- the period of the expert in specialised services and tooling was increased to 24 m/m
- the period of the adviser for after-sales-service was increased to 42 m/m
- under subcontract with a local firm an adviser in marketing management with a period 18 m/m and an adviser in financial management with a period of 42 m/m was added
- the budget for the support personnel was increased to 46.000,-- US Dollars
- the budget for experts travel was increased to 11.000,-- US Dollars
- the budget for other personnel costs was increased to 8.000,-- US Dollars
- the budget for the equipment was increased to 362.300,-- US Dollars, and a detailed list under Annex D was added
- under Miscellaneous the budget for operation and maintenance was increased to 7.000,-- US Dollars
- the budget for reports was increased to 4.600,-- US Dollars
- the budget for sundries was increased to 11.000,-- US Dollars

- at clause "Part II.A-Preparation of work plan" the participation of the two consultants was included and the updating of the prelimiary time tables of main activities was introduced

- at clause "Part II.J-Development support" the reference to the preparation of an updated market survey was omitted

- at clause "Part II.K-Institutionall support" it was stated that the chief technical adviser will be the head of the expatriate expert staff and report to the general manager of BDP
- at clause "Part III-Schedule for review monitoring, evaluation and reports, Para "A Annual Review" the cooperation with the two consultants was introduced

- the table of the project budget covering UNDP contribution was modified according to the afore mentioned changes and amendments

Annex 2

JOB DESCRIPTION CHIEF TECHNICAL ADVISER/ TECHNICAL MANAGER

Duration: One month

Date required: July 1985

Duty station: Dhaka, Ghazibur (with possibility of travelling within the country)

Purpose of project: To assist the Bangladesh Diesel Plant in the improvement and expansion of the productivity and line of production

Duties: The expert will be attached to the Bangladesh Diesel Plant Ltd. and will specifically be expected to:

1.) Assist the BDP in the utilization of the plant's full capacity and thereby increasing the percentage of BDP produced parts of the present line of production on Deutz-Diesel engines.

2.) Assist the BDP in extending their line of production of Diesel-Engines up to 6 cylinder engines of the same engine family with an adequate portion of BDP produced parts.

3.) Assist the BDP in extending their line of production to diesel engine driven units, i.e., pump units, marine drives, generator sets, etc., with an adequate portion of locally produced parts.

4.) Provide technical and general guidance in the following areas:
   a) Introduction of an adequate production planning section
   b) Introduction of an adequate product design section
   c) Introduction of an adequate maintenance organisation
   d) Introduction of an adequate quality control organisation
   e) Introduction of adequate after sales-services with service-centers, manuals and training of staff and customers

5.) Assist the BDP in the increase of cooperation with other public or private enterprises to raise the portion of locally produced parts.

6.) The expert also will be expected to prepare in cooperation with consultants:
   a) The jcb descriptions of the rest of the experts
   b) Prepare an detailed planning of activities on imidiate objectives of the project
   c) Prepare an evaluation report on the progress of the project every 6 monthes with a revision of the project objectives
   d) Report to UNDP/UNIDO Bangladesh on project matters
   d) Prepare a final report, setting out the achievements of the project and recomandations on further actions

Qualification: Mechanical Engineer with extensiv experience in manufacturing of diesel engines and in operation of diesel plants.

Language: English

Background Information: The Bangladesh Diesel Plant Ltd. (BDP) was established in 1966 as a state owned company on the basis of multilateral agreements with the Kloeckner-Humboldt-Deutz AG of the Federal Republic of Germany. The main direction of the acitivity of the BDP is manufacturing of diesel engines and spare parts.

At present BDP is manufacturing one-cylinder engines typ F1L 210D with 73% by value manufactured locally, two-cylinder engines typ F2L 912 and three-cylinder engines typ F3L 912 with approx. 25% per value produced locally.

The present capacity of production of BDP is 8000 cylinder per year at three shift operation.

BDP is located approx. 30 km north of Dhaka.

Annex 3

Itinerary of the acitivities in Bangladesh

12.4.1985

Arrival of Dr. Thomas Vietorisz and Mr. Walter A. Krachler in Bangladesh.
First contact with RR Mr. Holzhausen and JPO Mr. Petri for arrangement and coordination.
Meeting with Mr. Stall, who gave a short history on the development of BDP.

13.4.1985

Meeting at KHD Ltd. with Mr. Hadamzyk and Mr. Mujibur Rahman and Mr. Petri with information on the connection of DBL with BDP and its role in the development of BDP and the presales and aftersale services.

13.4.1985

Visit to BDP and discussion with General Manager of BDP Mr. Khandkar, Mr. Stall, Mr. Mujibur Rahman and Mr. Hadamzyk. G.M. Khandkar informed us that a revised project document has been accepted at the ERD. After discussion of the implementation that the changes were not discussed with UNIDO/ UNDP. The production facilities of BDP were visited.

14.4.1985

Visit to UNIDO and discussion with Mr. Lavides and Mr. Petri and presentation of the different views on the situation of the project.

14.4.1985

Discussion between Dr. Vietorisz and Mr. Krachler about the first impressions. As a results of the discussion a rough plan for future activities was drafted.

15.4.1985

Visit to the Ministery of Finance and Planning. Discussion with Deputy secretary Dr. Abdel Matin, ERD together with Mr. Petri. Dr. Matin explained the present situation and the view of ERD with respect to the project and informed us that an project document corrected in line with the views of the government of Bangladesh is now ready for signing.

Visit at Bangladesh Steel and Engineering Cooperation. Discussion with the Director of Planning and Development Dr. Achmed and Mr. Mujtahid, General Manager of the Planning Department together with Mr. Petri. Dr. Achmed explained the function and role of BSEC. Also the matter of the changes of the project document were discussed. Dr. Achmed accepted our main points readily, furthermore he suggested that the cooperation between BDP and BMTF should be increased to utilise BMTF capacity.

Visit to the Ministry of Industry Planning Section. Discussion with Dr. Nazrur Islam together with Mr. Petri. The second five year plan is now under preparation and forsees an increase on the cross product of privat industries to approx. 36 % and an increase on demand in diesel engines to 35000 diesel engines per year.

In the evening in the Sherton Business Center a working session with Mr. Khandkar, Mr. Stall, Mr. Hadamzyk and Mr. Mujibur Rahman.

During the session the preparation of the amendments to the project paper were started.

16.4.1985

Visit to the Bangladesh Machine Tool Factory. Discussion with Dir. Syed Hamed and Dr. Mirza Khairuzzaman. BMTF is very interested to continue and increase the cooperation with BDP. BMTF has an up to date equipment and a lot of possibilities for machining parts for BDP. BMTF has an assembly line for Mitsubishi 1-cylinder diesel engines and is manufacturing several type of pumps.

Visit to BDP. During the discussion with Mr. Khandkar, Mr. Stall, Mr. Schütz and Mr. Hans were informed about the present situation of the mission.

17.4.1985

Visit to the Ministery of Industry, Planning Section, Harward Institute for International Development. Discussion with Mr. Norbey Lead Adviser and Mr. R. Warner. After explaining the purpose of the mission, some information on marketing, standards and legal regulation were discussed.

17.4.1985

Visit to Bangladesh Agriculture Development Cooperation. Discussion with the Chairman Mr. Ansar and Irrigation Director Nazrur Allam. Chairman Ansar explained the general policy of BADC to buy pump units and to sell them without profit. During the discussion it was pointed out that the present tender system is legally backed but that he would any time give an order to BDP if the prices were reasonable and the percentage of locally produced parts are at least 50 percent.

Also the rgle of foreign donors were discussed.

17.4.1985

Discussion at UNDP with RR Mr. Holzhausen and Mr. Petri. Our point of views and intention were discussed with the main object to keep Mr. Stall and KHD and to increase, if possible, the frame of the project.
Visit to UNIDO. Discussion with representatives of Yanmar, together with Mr. Lavides, Mr. Petri. Yanmar is erecting an assembly line and the production of simple part for one- two- and three-cylinder diesel engines with an max. capacity of 6000 cylinder per year.

18.4.1985

Visit to BSEC. Discussion with the Chairman Nefaur Rahman. After explaining the purpose of our mission and our intension Mr. Nefaur Rahman agreed fully with our main points and assured us he will look personally into everything that the cooperation between the BSEC daughters will be as good as possible.
Discussion at UNIDO with Mr. Lavides, Mr. Petri about the draft of the report on the mission. Mr. Lavides informed us, that the maximum frame couldn't be higher than 2,8 Mill. US Dollar.
Discussion at UNDP with RR Holzhausen, Mr. Lavides, Mr. Petri. Mr. Holzhausen agreed to the extension to the maximum frame of 2.8 Million and to the changes and amendments to the project document.

18.5.1985

Preparation of the preliminary report by Mr. Vietorisz and Mr. Krachler.

Departure of Mr. Vietorisz.

19.4.1985

Continuation in preparation of the preliminary report.

20.4.1985

Visit to BDP and discussion with Mr. Khandkar and BDP Product Manager Mr. Ashraf and Mr. Stall, Mr. Schütz and Mr. Hans. Concerning product prices and the list of acitivities to amend the DPD. Visit to the production maintenance and service facilities.

21.4.1985

Visit to UNIDO and discussion with Mr. Lavides and Mr. Petri concerning the amendments to the BPD with start of the preparation.

22.4.1985

Visit to BMTF, short discussion with General Manager Mr. Khairuzzaman concerning the tension in the relation between BMTF and BDP. Extensiv tour of BMTF for evaluation of the practical possible increase on cooperation between BDP and BMTF.

22.4.1985

Short visit to BDP and discussion with Mr. Stall, Mr. Schütz and Mr. Hans about list of acitivities. Present contract for the three provided by KHD AG is expiring at the end of June, 1985.

Continuation of preparation of the amendments for the DPD.

23.4.1985

Visit to UNIDO. A telex was received from UNDP to go ahead with signing the project document with amendments as discussed with Dr. Vietorisz, but without giving specific instructions.
Continuation of preparation of the amendments to the project document.

24.4.1985

Visit to UNIDO. The Bangladesh Government in the meantime has signed a project document amended and changed without any contact to UNDP and with the changes and amendments different to the intended amendments of the mission, and different to the standard procedure of UNDP.
Continuation of preparation for the amendments for DPD.

25.4.1985

Visit to UNIDO. During preparation of the amendments to the DPD it has become clear, that the intended amendments are contradicting important parts of the original project document Therefore the project document has to be changed to include the intended modifications and amendments in the proper way, with the hope that the Bangladesh Government were not to proceed with the changed project document through the full channel of burocracy. But it was clear, that first UNDP has to give the go head to DPD before signing.

26.4.1985

Departure of Mr. Krachler.

Annex 4

UNITED NATIONS DEVELOPMENT PROGRAMME

Project for the Government of
the People's Republic of
BANGLADESH.

DRAFT PROJECT DOCUMENT

Title	: Assistance to the Bangladesh Diesel Plant
Project Number	: BGD/84/037/A/01/37 Duration: Three years and nine months
Primary Function	: Direct Support
Secondary Function	: Institution Building
Sector (Govt. Class)	: Industries (UNDP Class and Code): Industries (35)
Sub-Sector (Govt. Glass)	: Steel and Engineering Industries (UNDP Class and Code):
Government Implementing Agency	: Bangladesh Steel and Engineering Corporation Bangladesh Diesel Plant
Executing Agency	: United Nations Industrial Development Organization (UNIDO)
Estimated Starting Date	: July, 1985
Government Inputs	: Taka 20.000.000 (local currency - in kind) UNDP Inputs: 2.772.400,-- (US Dollars)

Signed: _____ Date: _____
on behalf of the Government

_____ Date: _____
on behalf of the Executing Agency

_____ Date: _____
on behalf of the UNDP

LEGAL CONTEXT

This project Document shall be the instrument (therin referred to as a Plan of Operation) envisaged in Article 1, paragraph 2 of the Agreement between the Government of the People's Republic of Bangladesh and the United Nations Development Programme concerning assistance under the Special Fund Sector of the United Nations Development Programme, signed by the parties on 12 July, 1972.

PART II.A.

DEVELOPMENT OBJECTIVE

1. To expand and develop the engineering industries in Bangladesh through the production of quality diesel engines with higher horsepower rating to supply the demand of the domestic market and thus make Bangladesh self sufficient in diesel engines.

2. To strengthen the capabilities of the management staff of BDP, an important manufacturing enterprise in the public sector to achieve profitable operations.

PART II.B.

IMMEDIATE OBJECTIVE

The immediate objectives of the project are:

1. To achieve full capacity utilization of the Bangladesh Diesel Plant and optimization of production facilities in order to supply the domestic demand thereby reducing imports:

- to increase the portion of local production to an optimum
- to expand the range of production up to 6-cylinder engines
- to introduce the manufacturing of endproducts ie Pumpsets, Generatorsets, Marinedrivesets, etc.
- to utilise existing capacities in BMTF and other public or privat enterprises

2. To improve the capabilities of the national staff in the production of diesel engines with capacities ranging from 2 to 6 cylinders and achieve self reliance in the manufacture of these engines and end products with theses engines.

3. To establish systems in quality control, maintenance and cost accounting.

4. To adopt a marketing and sales programme based on updated market survey.

5. To strengthen after sales service of Bangladesh Diesel Plant in order to increase the market share of its products and thus improve the company's profitability.

6. To establish a regular training programme for staff development including training in management for key officers.

PART II.C.

SPECIAL CONSIDERATIONS

To provide continuity to the previous technical assistance grant of the Government of the Federal Republic of Germany, the Government of Bangladesh has emphasized the desireability of assigning qualified engineers and technicians from Kloeckner-Humboldt-Deutz AG., to serve under the project.

PART II.D.

BACKGROUND AND JUSTIFICATION

The Bangladesh Diesel Plant Ltd., (BDP) was incorporated on 11 November 1981 as a public company under the Companies Act (Act. VII) of 1913. One of its objectives is "to manufacture diesel engines and spare parts of such engines and assemble such engines from imported parts and to buy, sell, manufacture, store, repair, convert, alter, remodel, let-on hire, and deal in diesel engines and other machinery, implements, and hardware of all kinds.

The authorized capital of the company is Taka Seventy Million (Tk. 70.000.000,--)

The following information would provide relevant background information on the history and status of BDP.

1. Inception: In pursuance of the Industrial Development policy of the Government of Pakistan, the necessity for establishing a diesel engine manufacturing plant in the territory what is now Bangladesh, was felt in the early sixties on the basis of the growing demand for diesel engines in different sectors such as agriculture, industry, fishing, marine/road transport, energy etc. With the objective of catering to the immediate need of the then East Pakistan Agricultural Development Corporation now Bangladesh Agricultural Development Corporation (BADC) requiring 30,000 engines during the period (1965-70) for low lift pumps (LLP) irrigation under the "Green Revolution Programme" of the Government, the then East Pakistan Industrial Development Corporation (EPIDC) decided to set up a plant in the name and style of "Pakistan Diesel Plant" (now BDP) at Joydevpur, Dhaka. Accordingly, an agreement was signed in December, 1966 between EPIDC and a German Consortium consisting of M/s. Kloeckner-Humboldt-Deutz AG., (KHD) as the licensor and M/s. Coutinno,-Cargo & Co. (CCC) as the supplier of the plant for progressive manufacture of Deutz air-cooled diesel engines of the FL 812 serie (1 to 6 cylinders) in the power range of 8 to 100 H.P.

2. Implementation: On the basis of the above Agreement and the provision of suppliers credit of about DM 8 Million a scheme was prepared for setting up the plant for the progressive manufacture of 1 and 2-cylinder engines (8 & 16 H.P.) with a capacity of 3,000 engines per annum. The implementation of the project started in the middle of 1968, after the approval of the Agreement and the scheme by the Government in April,1968

The plant was scheduled to be completed in 24 months i.e. by middle of 1970 and was expected to achieve the local manufacture to the optimum level of 70% by value, within this period in 3 stages (1st stage - assembly, 2nd stage - 40% localisation and 3rd stage 70% localisation). Although the project was ready to start the first stage of production i.e. assembling in January, 1970, the whole project could not be completed as envisaged due to various difficulties and bottle-necks. With the start of the war of liberation in March, 1971, the implementation of the project was delayed for an indefinite period. At that stage nearly 85% of the plant/machinery were received at site and installed.

3. Reactivation of the plant for completion: Project implementation could not be resumed immediately after liberation since the agreement with M/s. KHD and CCC could not be implemented with the emergence of Bangladesh as an independent state from December 16, 1971. Furthermore, financial assistance was needed for supplies, for replacement of items damaged or lost during the war, for repair of the machineries which have been idle for a long time, for technical assistance and for repayment of the outstanding credit. Subsequenctly negotiations started with KHD/CCC for reactivation and completion of the plant. Finally, the government of Bangladesh approached the Government of the Federal Republic of Germany (FRG) for a capital Aid in September, 1973 to enable completion of the project. After series of discussions and thorough appraisal of the project, the Government of the Federal Republic of Germany, through KFW, granted a project loan of DM 8,4 million at the interest rate of 0,75% per annum repayable over 30 years with a grace period of 10 years under a loan and project agreement concluded in March, 1975. As part of the agreement with KFW, an addendum to the original agreement with KHD/CCC was signed in August, 1976 for completion of the project.

Accordingly, the scheme of the project was revised for completion of the project under Phase-I with the production of a smaller model engines, type F1L 210D (6 to 12 H.P.) where 73% by value, of every engine manufactured is locally produced. The production of FL 912 series engines (2 to 6 cylinders), 20 to 120 H.P. would be gradually introduced under Phases II and III as soon as the production line for F1L 210D models is fully operational.

Trial production of F1L 210D engines started in October 1979, with 42% local component and this percentages progressively reached the optimum level of 73% by value of locally manufactured components by June, 1980. Subsequently, the local manufacture of FL 912 series engines (2 to 6 cylinders) started from the fiscal year 1981-82 and by 1984 the localisation of over 30% by value for F2L 912 (2-cylinder engines) has been achieved.

4. Production: The assembling of F1L/F2L 812 model engines as per original scheme started in January, 1970, and this had to be continued up to 1978-79 in order to include assembling of other models namely F1L/F2L 812/912 and F1L 208/210D engines. The reason for this is that the plant was not yet ready to manufacture locally the components for these engine models. Since the inception of this plant up until 1984 a total of about 22,000 engines of different models have been assembled and manufactured. In addition to this, another 4731 engines of model F2L 812 were assembled by M/s. Deutz-Pakistan Ltd.,s in their plant at Tongi, for the periods 1967-68 and 1968-69, on behalf of BDP based on the demand of the then Agricultural Development Corporation.

5. Technical Assistance: When the implementation of the project was nearing completion with the loan of DM 8,4 million, subsequently converted into a grant, further financial assistance was required for obtaining the services of experts to assist in the local manufacture of F1L 210D engines and, to provice training to the local engineers.
Therefore the German Government was again requested for an additional DM 4,3 million as technical assistance grant and this was granted through KFW under an agreement signed in 1980 where KHD was to provide the services of 9 experts for a total of 216 man-monthes during the periods 1980-81 and 1981-82. This TA was granted for the transfer of technology in the production of model F1L 210D engines. However, when the German Government was approached for the third time to provide further technical assistance to the production of model F2L 912 series engines, the request was not approved. One reason for the rejection was, that the German Government wanted BDP first to concentrate on manufacturing single cylinder engines before going into the production of larger engines. However, the Bangladesh Government feels that in view of the increasing demand for engines with higher power output, BDP should now develop its expertise in producing multicylinder engines.

6. After Sales Service: With the increasing number of Deutz engines being used in Bangladesh, the service organization of DBL had to be strengthened. In the past, after-sales services of BDP-manufactured engines were undertaken by BADC, but, it was brought to the attention of BDP that BADC's services were not satisfactory. In order to correct this situtaion, government advised BDP to provide after-sales-service. In 1982 BDP decided to establish four regional centres and a central workshop in its factory compound to service the after-sales-requirements of their customers. BDP also appointed DBL as its prinipal service agent.

Consequently, DBL enlarged its central service workshop and Training Centre situated at Tejgaon Industrial Area, Dhaka and opened two more service centres outside Dhaka, one at Cox's Bazar and another at Bogra. The central service workshop of DBL is equiped with modern fascilities, mobile service vans and manned with German Engineers, German trained Bangladesh Engineers and local skilled technicians.

The Central Workshop of BDP would cover the Dhaka district while the regional centres as shown below would have camps established in the respective towns indicated -

1. Mymensingh - with camps at Jamalpur, Tangail, Kishoreganj, Trishal, Muktagacha, Gaffargaon, Netrokona.
2. Bogra - with camps at Sherpur, Gabtali, Shariakandi, Rangur, Dinajpur
3. Pabna - with camps at Rajshahi, Jessore, Faridpur, Kushtia, Natore, Nawabganj, Madaripur.
4. Comilla - with camps at Sylhet, Chittagong & Cox's Bazar.

Under the present scheme, BDP services provided to farmers are free of charge and engine parts which are damaged but which are traceable to manufacturing defects are also given free of charge against a guarantee claim. However, farmers have to pay other spare parts used in the repairs. A large number of F1L 210 D, F1L 208D and FL 912 series engines have been serviced or overhauled by BDP staff and this has cultivated the confidence of the farmers on the reliability of BDP's after sales service. It must be recognized however that at this stage BDP's after-sales-service is limited in scope i.e. basically trouble shooting in the field while major repairs have to be done in the central workshop.

This because the regional centres have limited tools, testing equipment etc. and their staff have yet to be trained to handle various service situations.

A market survey on diesel engines completed in April was prepared for BSEC by a local consulting firm. The survey showed the following average annual demand for diesel engines (Clase 2 to 17; horsepower range 5 to 500) for three five year periods:

1980 - 1985 - 31,350 Units
1985 - 1990 - 34,945 Units
1990 - 1995 - 55,025 Units

The largest demand, as stated in the survey, is for Class 2 engines (one cylinder, 5-6,5 HP) most of which are for shallow tubewell pumps while the other users would be inland water vessels and fishing boats. This demand forecast is supported by the requirements of BADC for small horespower engines, type F1L 210D (6-12 HP) estimated at 30,000 units, as reflected in the Government's third five year plan for the period (1985-1990). In the same plan the demand for medium horsepower engines (2 cylinders, 18-31.5 HP corresponding to model F2L 912) for deep tubewell pumps is estimated at 15,000 units. Fishing boats and jeeps are the users of engine type F2L 912 and F3L 912 (3-cylinder), while F4L 912 and F6L 912 models (4 and 6 cylinder respectively) are used in buses, microbuses and trucks.

In order to rationalize product specifications, the Government has started to establish a national standard for diesel engines for agricultural applications and a similar exercise is underway for buses and truck engines.

The Bangladesh Machine Tools Factory (BMTF) and BDP, both doughters of the Bangladesh Steel and Engineering Corporation are the only factories capable of assembling or producing single-cylinder engines at present, however, recently the Government has asked BMTF to demobilise its acitivties with diesel engines. In the case of the other four companies which have been sanctioned to produce diesel engines, no progress has so far been made to establish their production.
BDP has an annual capacity of 8,000 engines (3-shift operation) if it produces only one-cylinder engines, or it can manufacture 4,000 units per year (3 shift operation) of 2-cylinder engines or 2,000 units per year (3-shift) of 4-cylinder engines. Therefore BDP has flexibility in producing a variety of engines.

JUSTIFICATION

From the start if its commercial operations in 1980 up to this date (mid 1984) the Bangladesh Diesel Plant Ltd. has been continuously incurring losses. This has resulted from production costs and administrative costs which have always been higher than the total revenues as shown in the financial reports covering the period 1st July 1982 up to 30th June 1984. One of the primary reasons for low sales volumes and sales revenues is, that no analysis is made to forecast the market demand for each model. This has resulted in the manufacture of some models in certain years where only a few units out of the total number of engines produced were sold. This is clearly seen in Annex A, where the production and sales for three consecutive fiscal years are shown (1981-82, 1982-82 and 1983-84). This same Annex shows that there is an increasing demand for diesel engines with more then one cylinder.

Another factor which has adversely effected sales before 1982 was the poor after-sales-services to BDP-produced engines by BADC which resulted in potential BDP customers purchasing imported engines from dealers who offered better after-sales-services. The third factor which could account for low-sales was the lack of quality control in the manufacturing process detected by the natures and frequency of repairs in the field. Therefore, while one of the major goals of the project is to attain full capacity utilization and optimization of production facilities, the production programme would have to be based on an updated market survey and a demand forecast for models to be manufactured. Consequently, also a system of quality control should be established and a standard operating manual should be prepared and used to improve plant efficiency and product quality. A carfully designed in-plant training programme should be held regularly to orient and train the engineers and technicians on the applications of the quality control and maintenance procedures which should result in lowering production costs and improving the competitive position of the products in the market. Regular training courses would also have to be held for all staff members involved in after-sales -services. A review of the company's procedures in the preparation of accounting records, as well as their periodic financial statements would be undertaken in order to streamline the accounting system and install a cost accounting system suitable for their operations.

To improve the efficiency computerized cost keeping stock-control and production optimization have to be introduced. It is also very important to improve coordination and cooperation within the BSEC family and other public or private enterprises.

PART II.E - OUTPUTS

1. An updated market survey indicating the demand gap for diesel engines with higher horsepower rating (2 to 6 cylinder) up to year 1990.
   The future updates of the mastersurvey have to be done by an agreed methodology.

2. A well designed and operational production management system to enable the factory to produce engines of various sizes and in the process utilize the full capacity of the plant including the introduction of computer aided production optimisation.

3. Standard operation manuals for implementing a quality control system and for maintenance of plant equipment and facilities, for higher efficiency translated to Bangla.

4. A manual to streamline the procedures for keeping company's accounts, preparation of financial reports (primarily balance sheet and profit and loss statements) and to implement a cost accounting system, including the introduction of a computer aided cost keeping system and the translation of the manual into Bangla.

5. A cadre of well-trained engineers and technicians capable of running the factory efficiently following the established production management system, a quality control scheme and a maintenance programme.

6. A well organized and efficiently managed after-sales-service composed of well trained staff to attend to the required services in the field and to impart training to their customers.

Also to create a field maintenance manual in Bangla presented with "comic's" type pictures at a level understandable also to the average small farmer

7. A worked out procedure for coordinating BDP production and sales acitivities with production and sales acitivities of

   a) other BSEC components

   b) other public and private engineering enterprises

both in terms of forward and backward linkages.

8. A worked-out procedure, agreed with the Government, to regularise product standards and the production rate of BDP capacity, together with BMTF component production capacity.

PART II.F - ACTIVITIES

Shown below are broadly stated activities, details of which will be prepared and finalized in conjunction with the preparation of work plan (Part II-H) after arrival of the Chief Technical Adviser/Technical Manager.

1. During the first month of the project, the Chief Technical Adviser and the BPD General Manager, with the participation and assistance of the two Consultants (Industrial economist, diesel engine adviser) will prepare two documents:

   - A survey of overall project objectives and of total resources/information available to the project (either currently or later);
   - A work programme and project management timetable showing detailed activities, the network of their interrelations, acitivity costs, and resource requirements by activity

These two documents should be agreed upon by the BDP General Manager, the Chief Technical Adviser and the two Consultants and should include the following activities:

a. Preparation of an updated market survey to determine the demand gap for diesel engines for the next 5 to 10 years;
b. Establish a production management system, a quality control system and a scheme for maintenance of plant facilities;
c. Implement a training programme (on the job and abroad, if necessary) to prepare the technical staff to operate the company efficiently as a team;
d. Review the company's present system of mainteining the accounts and preparing financial reports and recommend steps to streamline the system and to establish a cost control system;
e. Review the present after-sales-service procedures and prepare a plan to improve this procedures. The plan should include a scheme to train field staff who in the process of their work could train their customers in basic engine trouble shooting.

Preliminary timetables of the major acitivities to be included for each expert are set out in the Annex C to the present Draft Project Document.

2. These documents will be revised as needed, with a formal revision and re-evaluation schedule after a lapse of one, two, and three years, with the participation of the same persons as indicated above.

3. As work on the project progresses regular review sessions would be held between the BDP General Manager and the Chief Technical Adviser to determine the status of their work vis-a-vis the overall work plan and agree an appropriate course of action.

PART II.G. - INPUTS

1. Government

The following officers will compose the counterpart staff:

a) General Manager - Head of Counterpart Staff
b) Technical Manager
c) Production Engineer
d) Maintenance Engineer
e) Engineers for Assembly and Testing
f) Engineers for Aliminum Foundry
g) Engineers for Tooling Section
h) Engineers for Product Design
i) Quality Control Engineers
j) After Sales Service Engineers
k) Financial Management Officer
l) Marketing Management Officer

Office accommodation for all project staff will be provided at the Bangladesh Diesel Plant Offices, furnished and equipped ready for use.

2. UNDP Inputs

UNDP will provide the following international experts:

1.	Chief Technical Adviser/Technical Manager	45 m/m
2.	Adviser in Marketing Management	18 m/m
3.	Adviser in Financial Management and Computer Software	42 m/m
4.	Industrial Economist: for project planning and on-going technical evaluation	4 m/m
5.	Mechanical Engineer, Diesel Engine Adviser	4 m/m

Under sub-contract with KHD

1.	Production/Quality Control Engineer	42 m/m
2.	Maintenance Engineer	42 m/m
3.	Product Chief Designer	42 m/m
4.	Instructor for Engine Assembly and Engine Testing	10 m/m
5.	Instructor for Aluminium Foundry	10 m/m
6.	Expert in Specialized Services, including Tooling	24 m/m
7.	Supervisor after sales service	42 m/m

Under sub-contract with a local firm

7.	Adviser in Marketing Management	18 m/m
8.	Adviser in Financial Management	42 m/m

In addition, UNDP will make budgetary provision for:

Support Personnel (including Bengali translators)	$ 46,000
Experts Travel	$ 11,000

Other Personnel Costs	$ 8,000
Training (for institutions other than KHD)	
Fellowships, 12 Engineers at 3 months each abroad	36 m/m
Study Tour, executive staff	12 m/m
Equipment	
Consisting of transport, service vans, traning aids, tooling & tools for servicing, machinery and equipment for service and training purposes, motorcycles, etc. as per Annex D	$ 362,300
Miscellaneous	
Operation and Maintenance	$ 7,000
Reports	$ 4,500
Sundries	$ 11,000
Total miscellaneous component	$ 22,500

PART II.H - PEPARATION OF WORK PLAN

The General Manager of the Bangladesh Diesel Plant will prepare a tentative work plan before the arrival of the Chief Technical Adviser. This plan will then be discussed with the Chief Technical Adviser and the two consultants at the start of the project and thereafter finalized to show details such as arrival and tenure of other experts and specific activities to be undertaken by them, schedule of fellowships and study tours, etc.

The final work plan will be attached as an Annex to the project document and the preliminary timetables of the mainactivities (stated under part II.F - Activities) will be updated and elaborated more in detail.

PART II.I. - PREPARATION OF FRAMEWORK FOR EFFECTIVE PARTICIPATION OF NATIONAL AND INTERNATIONAL STAFF IN THE PROJECT

The General Manager, BDP will serve as overall coordinator of the project. In consultation with the Chief Technical Advisor, he will arrange the holding of regular meetings of all project staff to assess progress of work and resolve outstanding issues. Special meetings should be held, when necessary to ensure understanding of new procedures which have to be adopted and to minimize delays in any acitivity.

PART II-J-DEVELOPMENT SUPPORT

The project should maintain close communication with officials of the Deutz Bangladesh Ltd (BDL) as the project progresses since DBL's views would be useful especially in the production of components of various engines and in BDP's efforts to strengthen its after-sales serice.

PART II.K - INSTITUTIONAL SUPPORT

The Bangladesh Diesel Plant shall be the counterpart agency for this project. Since BDP is a subsidiary of the Bangladesh Steel and Engineering Corporation (BSEC), BDP will ensure that BSEC is made fully aware on developments in the project. The Organization Chart of Bangladesh Diesel Plant is shown in Annex - 'B'.

The General Manager of BDP will work very closely with the Chief Technical Adviser during the implementation of the project as Head of the counterpart staff. He shall assign and give authority to a senior member of the counterpart staff who should carry on his work in his absence. He shall organize the working teams i.e. the counterpart staff and the international staff to ensure co-operation between them. The Chief Technical Adviser will be the Head of the expatriate staff and report to the General Manager of BDP. The Chief Technical Adviser should communicate with UNDP/UNIDO, Dhaka with respect to project matters. He shall assign and give authority to a member of the UNDP Experts to carry on this function during his absence.

The BDP General Manager should also communicate with UNIDO in Dhaka when necessary.

PART II.L - PRIOR OBLIGATIONS AND PREREQUISITES

Preparation of a tentative work plan by the BDP General Manager before arrival of Chief Technical Adviser/Technical Manager.

PART II.M - FUTURE UNDP ASSISTANCE

Before the completion of the project, consideration may be given to a further phase to expand the range of acitivities being undertaken by Bangladesh Diesel Plant especially in the area of after-sales-service and related products development.

PART III - SCHEDULE FOR REVIEW, MONITORING, EVALUTION AND REPORTS

A. Annual Review

An annual review of the project will be carried our at the end of each year in cooperation with the 2 consultants, in order to give flexibility in regard to external inputs, outputs and project objectives, which will be re-assessed on the basis of each 12 months experience.

B. Tripartite Monitoring Review, Technical Review

The project will be subject to periodic review in accordance with the policies and procedures established by UNDP for monitoring project and programme imlementation.

C. Evaluation

The project will be subject to technical evaluation in accordance with the policies and procedures established for this purpose by UNDP.

D. Progress and Terminal Reports

Progress reports will be prepared by the Chief Technical Adviser every six months until the end of the project.
A draft terminal report for the project will be prepared by the Chief Technical Adviser at the end of the period.

PROJECT BUDGET COVERING UNDP CONTRIBUTION

(in US Dollars)

Country: The People's Republic of Bangladesh
Project No.: DP/BGD/037/A/01/37
Project Title: Assitance to the Bangladesh Diesel Plant

10 PROJECT PERSONNEL

11 EXPERTS

		Total		1985		1986		1987		1988		1989	
		m/m	US$	m/m	US$	m/m	US$	m/m	US$	m/m	US$	m/m	US$
11-01	Chief Technical Adviser/ Technical Manager	45	320.100	6	39.000	12	81.600	12	85.800	12	90.000	3	23.700
11-02	Adviser for Marketing Management	18	114.450	3	18.750	12	76.000	3	19.700	12			
11-03	Adviser for Financial Management and Computerized Software	42	275.250	3	18.750	12	76.000	12	78.500	1	81.000	3	21.000
11-51	Industrial Economist	4	31.650	1	7.350	1	7.700	1	8.100	1	8.500		
11-52	Mechanical Engineer/ Diesel Eng. Adviser	4	31.650	1	7.350	1	7.700	1	8.100		8.500		
11-99	SUB - TOTAL	113	773.100	14	91.200	38	249.000	29	200.200	26	188.000	6	44.700
13	Support Personnel		46.000		7.000		13.000		13.000		13.000		
15	Experts Travel		11.000		2.000		3.000		3.000		3.000		
16	Other Personnel Costs		9.000				3.000		3.000		3.000		
19	COMPONENT TOTAL		839.100		100.200		268.000		219.200		207.000		44.700

20 SUBCONTRACTS

21-00		Total m/m	Total US$	1985 m/m	1985 US$	1986 m/m	1986 US$	1987 m/m	1987 US$	1988 m/m	1988 US$	1989 m/m	1989 US$
21-01	Production/Quality Control Engineer	42	275.250	3	18.750	12	76.000	12	78.500	12	81.000	3	21.000
21-02	Maintenance Engineer	42	275.250	3	18.750	12	76.000	12	78.500	12	81.000	3	21.000
21-03	Instructor for Engine Assembly and Engine Testing	10	65.250	2	12.500	2	12.750	3	19.750	3	20.250		
21-04	Product Chief Designer	42	275.250	3	18.750	12	76.000	12	78.500	12	81.000	3	21.000
21-05	Instructor for Aluminium Foundry	10	65.250	2	12.500	2	12.750	3	19.750	3	20.250		
21-06	Expert in Specialized Services, incl.Tooling	24	157.000			6	38.000	12	78.500	6	40.500		
21-07	Superviser After Sales Service	42	275.250	3	18.750	12	76.000	12	78.500	12	81.000	3	21.000
21-99	SUB - TOTAL	212	1.388.500	16	100.000	58	367.500	66	432.000	60	405.000	12	84.000
22-00	LOCAL SUBCONTRACT												
22-01	Expert in Marketing Management	18	18.000	3	3.000	12	12.000	3	3.000				
22-02	Expert in Financial Management	42	42.000	3	3.000	12	12.000	12	12.000	12	12.000	3	3.000
22-99	SUB - TOTAL	60	60.000	6	6.000	24	24.000	15	15.000	12	12.000	3	3.000
29	COMPONENT TOTAL	272	1.448.500	22	106.000	82	391.500	81	447.000	72	417.000	15	87.000

		Total		1985		1986		1987		1988		1989	
30	TRAINING	m/m	US$	m/m	US$	m/m	US$	m/m	US$	m/m	US$	m/m	US$
31	Fellowship	36	78.000	2	4.000	14	29.400	14	30.800	6	13.800		
32	Study Tours	12	26.400			4	8.400	4	8.800	4	9.200		
39	Component TOTAL	48	104.400	2	4.000	18	37.800	18	39.600	10	23.000		
40	EQUIPMENT		362.300		112.300		150.000		100.000				
50	MISCELLANEOUS												
51	Operation and Maintenance		11.500		1.500		3.000		3.000		3.000		1.000
52	Reporting costs		2.100		100		500		500		500		500
53	Sundries		4.500		500		1.000		1.000		1.000		1.000
59	Component TOTAL		18.100		2.100		4.500		4.500		4.500		2.500
99	GRAND TOTAL		2.772.400		324.600		851.800		810.300		651.500		134.200

FINANCIAL STATMENT FOR THE LAST 3(THREE) FISCAL YEARS 1981-82, 1982-83, 1983-84 ANNEX A

ON PRODUCTION AND SALES

Kl. No.	Engine Model	Fiscal Year 1981-82				Fiscal Year 1982-83				Fiscal Year 1983-84			
		Production		Sales		Production		Sales		Production		Sales	
		Nos.	Value in Thousend Taka	Nos.	Value in Thousend Taka	Nos.	Value in Thousend Taka	Nos.	Value in Thousend Taka	Nos.	Value in Thousend Taka	Nos.	Value in Thousend Taka
1	F1 L 208 D	150	3828	297	2948							9	108
2	F1 L 210 D	351	8897	305	4159	650	9960	84	1477	1293	17923	417	5361
3	F2 L 912	447	28588	1	59	1500	97588	770	52526	108	6978	1056	88665
4	F3 L 912	230	23615	175	14165	306	23524	213	16935			142	11254
5	F4 L 912	7	841	1	120	4	319	7	314				157
6	F6 L 912			1	192	3	335			6	671	2	384
7	MISC.				368				2603		1219		1781

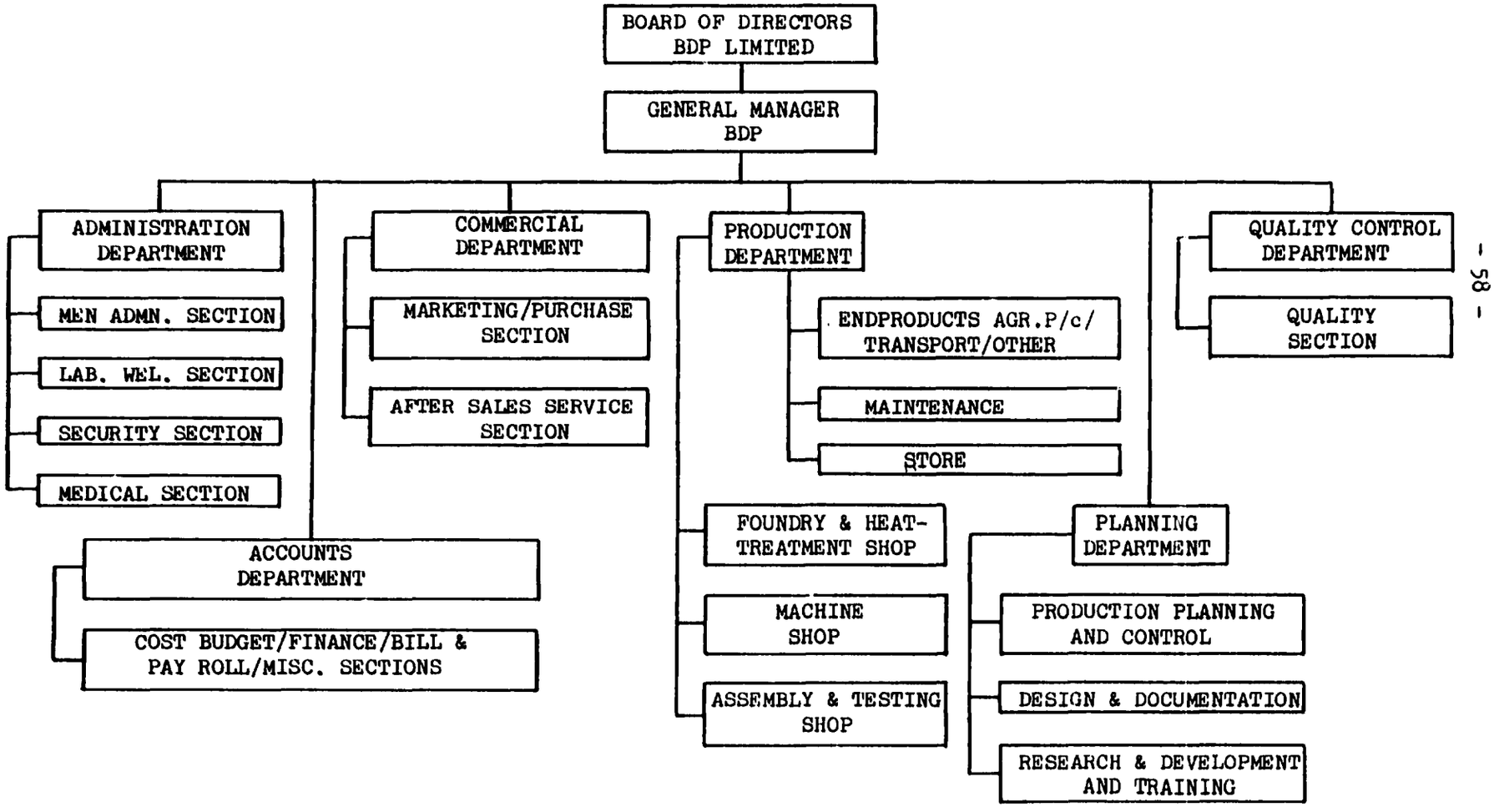
ANNEX B

B A N G L A D E S H D I E S E L P L A N T L T D.

(AN ENTERPRISE OF BSEC)

GHAZIPUR (JOYDEVPUR) DHAKA

PROPOSED SET UP



CHIEF TECHNICAL ADVISER / TECHNICAL MANAGER	Preliminary Timetable of Mainactivities
Activities	Project Months 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
Evaluation and Report on Present General Situation	
Jobdescriptions of Rest of Experts	
Detailed Planning of Activities and Revision of Prelim.Timtabl's	
Organisation of Cooperation with Different Expert's Counterpart	
Introduction of Regular Meetings and Reporting System	
Increase of Local Produc.by BDP with Utilizat.of BMTF & Loc.Man	F2L912 27 % to 37,8 % up to 49 % up to 62 % up to 75 %
	F3L912 up to 42 % up to 55 % up to 63 %
Introduc.of 4 and 6 Cyl.Eng.with Increasing Local Production	F4L912 up to 25 % up to 35 % up to 42 %
	F6L912 up to 25 % up to 35 % up to 42 %
Adaptation of Product.Plans Accrdg. to Forebast by Mark.Surv	
Checking on Project Progress & Experts Activities with Report	
Checking on Project Cost's Balance	
Production & Assembly of Units (Pumps,Generator,Marine Drive)	Draft & Report Pumpsets Marine Drive Sets Generator Sets
Final Report	
Coordination of Cooperation Between BDP,Subcontr. & UNIDO	

ADVISER FOR MARKETING MANAGEMENT	Preliminary Timetable of Mainactivities
Activities	Project Months 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
Evaluation of Pres.Marketing Proced.with Local Expert	
Detailed Planning of Activities & Revision of this Timetable	
Evaluat.of Exist.Market Survey April 1983 3rd 5 Year Plan	
Addit.Surv.on Needs: Engines, Pumpsets,Gen.Sets,Marin.Drives	2&3 Cyl. Engine; 4&6 Cyl. Engine; Units
Draft Future Production Plans Based on Surveys	2&3 Cyl.; 4&6 Cyl.; Units
Future Marketing & Complim.Sup. Resport,Discussion & Revision	Draft & Report; En- gines; Units
Check on Project Progress and Report with Analysis with LE	
Final Report Together with LE	

ADVISER IN FINANCIAL MANAGEMENT AND COMPUTERIZED SOFTWARE	Preliminary Timetable of Mainactivities
Activities	Project Months 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
Evaluation Pres.Situat.Accountng Prod.Costs,Overheads,Prod.Prices	
Detailed Planning of Activities and Revision of this Timetable	
Introduction of Necess.Changes for Man.Costkeeping & Training	Draft Introduction with Training Parallel to CACK
Draft Necess.Inputs & Dresired Outputs for Comp.Aid.Costkeep.	
Setting Up for Computersystem & Putting into Operation & Testrun	
Developing Software for Cack with Trialrun & Report	
Introduction of Cack Parallel to Manual Costkeeping	Parallel to MCK
Develop.Software for Comp.Aided Stockkeep.Cask,Trianrun & Report	
Introduction of Cask Parallel to Manual Stockkeeping	Parallel to MSK
Develop.Software for Comp.Aided Prod. Optimization Capo	
Introduction of Capo Parallel to Manual Production Optimization	Parallel to MPO
Check on Project Progress and Report with Analysis togeth.w.LE	
Final Revision of Software and Document together Counterpart	
Final Report Together with LE	

ENGINEER FOR QUALITY CONTROL	Preliminary Timetable of Mainactivities
Activities	Project Months 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
Evaluation and Report on Present Situation	
Detailed Planning of Activities & Revision of this Timetable	
Selecting Progr.& Training on Part Measuring Techn.	Improving present Part's Inspection System; Gradually Introducing QC for Part's; Gradually Introducing QC for Engines; Introduc. QC for Units
Selecting Programme and Training on Quality Control	
Introduc. Adequate Documentation for Inspect.& Quality Contr.	
	Part's Inspection; Quality Control
Draft Necessary Inputs & Desired Outputs of Comp.Aided Qual.Contr	
Introduction of CAQC in Cooperation w. Comp. Expert	
Check on Project Progress and Report with Analysis	
Final Revision of Documentation together with QG-Counterpart	
Final Report	

ENGINEER FOR MAINTENANCE	Preliminary Timetable of Mainactivities
Activities	Project Months 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
Evaluation & Report on Resent Situation	
Detailed Planning of Activities & Revision of this Timetable	
Reorganisation of Maintenance DPT & Introduction of Jobdescrip.	
Elaboration of Preventiv Maintenance Documentation	
Revision of Store System for Mainenance - Spares	
Selecting Programme and Training on Maintenance	
Check on Project Progress and Report with Analysis	
Final Revision of Documentation together with Maint.-Counterpart	
Final Report	
Coordinat.Maintenance & Modification with Production Schedule	
Inspection of Machinery,Equipment (Bimonthly Intervals)	

PRODUCT CHIEF DESIGNER	Preliminary Timetable of Mainactivities
Activities	Project Months 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
Detailed Planning of Activities and Revision of this Timetable	□
Evaluation of Present Situation with Report	—□
Setting Up and Organisation of an Engine and Prod.Design DPTMT	—□
Building Up of Complete Engine Documentation	1 & 2 Cyl. □ 3 Cyl. □ 4 Cyl. □ 6 Cyl. □
Introduction of Organisation for Part's Modification	Start Phase □ Operational
Improved Design of Units with LLP	Draft □ Proto-typ □ Fin. Doc. □
Improved Design of Units with STWP	Draft □ Proto-typ □ Fin. Doc. □
Design of Units with DTWP	Draft □ Proto-typ □ Fin. Doc. □
Design of Marine Drive Units	Draft □ Proto-typ □ Fin. Doc. □
Design of Generator Sets	Draft □ Prototyp □ Fin. Doc. □
Check on Project Progress with Analysis and Report	□ □ □ □ □ □
Final Report	□

INSTRUCTOR ENGINE ASSEMBLY & TESTING	Preliminary Timetable of Mainactivities
Activities	Project Months 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
Evaluation and Report on Present Situation	□
Detailed Planning of Activities and Resivion of this Timetable	□
Changes for Improvement of Present Situation	—□
Introduction of Assembly and Testing of 4 & 6 Cyl. Engines	4 Cyl.—□ 6 Cyl.—□
Introduction of Assembly and Testing of Units	Pump—□ Mar.-Dr.—□ Gen.—□
Check on Project Progress with Analysis and Report	□ □ □
Final Report	□

INSTRUCTOR FOR ALUMINIUM FOUNDRY	Preliminary Timetable of Mainactivities
Activities	Project Months 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
Evaluation and Report Present Situation	□
Detailed Planning of Acitivities & Revision of this Timetable	□
Changes for Improvement of Present Situation	—□
Introduction of New Parts for Engines	—□
Introduction of Crankcases for 2 & 3 Cylinder Engines	—□
Introduction of Crankcases for 4 & 6 Cylinder Engines	—□
Report of Project Progress with Analysis and Report	□ □ □
Final Report	□

EXPERT FOR TOOLING & SPECIALISED SERVICES	Preliminary Timetable of Mainactivities
Activities	Project Months 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
Evaluation and Report on Present Situation	
Detailed Planning of Activities & Revision of this Timetable	
Changes for Improvement of Present Activities	Draft & Rep.
New Tooling for Increase of Egnine Production	Draft & Rep.
New Tooling for Production of Units	Draft & Rep.
Documentation for Tooling	Draft & Rep. Introp. Phase
Check on Project Progress with Analysis and Report	
Final Report	

SUPERVISOR FOR AFTER SALES SERVICES	Preliminary Timetable of Mainactivities
Activities	Project Months 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
Evaluation of Present Situation with Report	
Detailed Planning of Activities and Revision of this Timetables	
Changes for Improvement of Present Service Activities	Draft & Rep. — Intro-duction
Draft for Extension Services System. Maintenance	
Draft for Increasing Service Fascilities in Type & Number	
Training of BDP Personnel on Engine Maintenance & Service	Draft
Training Ext. Personnel Field Maintenance & Service	Draft
Manual with Maintenance Sectin in 'Comincs' Form in Bangla	Draft — Trans-lation — Comics — Print
Extending Maintenance & Service to Assembled Units	Draft — Pump Sets — Marine Drives — Gener. Sets
Training of BDP Personnel on Unit Maintenance & Service	Draft
Training of External Personnel on Unit Maintenance & Service	Draft
Maintenance Manuals for Units with 'Comics' in Bangla	Draft — Translation
Check on Project Progress with Report and Analysis	
Final Report	

LOCAL ADVISER FOR MARKETING MANAGEMENT	Preliminary Timetable of Mainactivities
Activities	Project Months 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
Same Activities and Dates as Listed for Internat. Expert	— — — — — — — — —
Detailed Planning of Activities and Revision of this Timetable	□
Evaluation Pres.Situat.Standards and Spezif.for Diesel Engines	—□
Necessary Changes to Suit BDP Engines	—□
Evaluat.Present Situat.Standards on Spezification for Units	—□
Necessary Changes to Suit BDP Units	—□

LOCAL ADVISER FOR FINANCIAL MANAGEMENT	Preliminary Timetable of Mainactivities
Activities	Project Months 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
Evaluating of Present Situation Together with Internat.Expert	
Detailed Planning of Activities & Revision of this Timetable	
Introduction of Necessary Changes for MCK together with IE	Draft — Introduct with Training
Introduction of Cack together with IE	Parallel to MCK with Training
Evaluation of Prod.Costs,Improvements Conforming to Local Sit.	
Evaluation of Overheads,Improvements Conforming Local Situation	
Evaluation of Procurements Costs with Improvem.Conform Loc.Sit.	
Evaluation of Product-Costs Improvements Conform Local.Sit.	
Check on Project Progress with Analysis & Report Together w.IE	
Final Report Together w.IE	

Annex D

List of the Training Aids & Documents, Machinery and Equipments, Tools and Transportation Facilities required for Training Centre, After Sales Service Centres and Field Service Team of Bangladesh Diesel Plant Ltd

A. List of training aids and documents

A.I. FOR THEORETICAL TRAINING

1. Class Room, Furniture and Fixture for 50 Nos. of Trainees.

2. Training documentations and technical books for 50 Nos. of trainees

3. Training Aid and equipments e.g. Projector, Technical Films, Episcope, Diascope, photocopy machine, Blue printing Machine, cyclostylining machine, etc.

4. Models of engines, oil pumps, fuel pumps (Transparent type).

5. Sectional view of engines of different types

A.II. FOR PRACTICAL TRAINING

1. Steel tables and Tool cabinets for engine repairing — 10 Nos.

2. Complete set of hand tools with tool box for assembling and dis-assembling of diesel engine by the traineess — 15 sets.

3.	Complete set of measuring tools for checking dimensions of different parts of diesel engines by the trainees.	15 sets.
4.	Special instruments, gauges, meters, jigs and fixture required for assembling and dis-assembling of engines by the trainees	15 sets.
5.	Electric hand drilling machine (from 1 to 18 mm chuck size)	5 Nos.

B. FOR TRAINING WORKSHOP
(MACHINERY & EQUIPMENT)

1.	Grinding machine (two wheel)	1 Nos.
2.	Drilling machine (bench type)	1 Nos.
3.	Valve seat grinding equipment	1 Nos.
4.	Gas welding apparatus with gas cylinders	5 sets
5.	Electric welding transformers with all accessories	3 sets
6.	Hydraulic press (Spindle type) 500 Kg. capacity, testing equipment calibration	2 Nos.
7.	Nozzle cleaning equipment with different sizes of needles & brushes	10 sets
8.	Crack detecting aparatus for checking of cracks in crank shafts	4 sets

9. Fuel injection pump test bench for testing the fuel pumps of Diesel Engine upto eight cylinders with different accessories to test all types of in line and distributor type fuel injection pumps (Test Bench suitable for testing the pumps of BDP Deutz Diesel Engines, type F1L 210D and FL 912 series will be preferred). 1 set

10. Engine test bench (Dynamometer) with water brake or alternative arrangement for testing the engine BHP on load with all the accessories and instruments for measuring the engine RPM, Lub oil pressure, Exhaust temperature, fuel consumption and other necessary readings to be taken to test a standard Diesel Engine's output from 3 to 50 HP. Attachments, jigs and fixtures for easy mounting of 1, 2 and 3 cylinder engines of various types and models. 1 set

11. Portable steam jet cleaning apparatus (Electrically operated) for cleaning and de-waxing dirty engines with controlable hot water jet, and all necessary accessories to use the equipment inside and outside the work shop. 1 set

12.	Portable Work Shop Crane, 1000 kgs capacity with wheels for easy movement and locking device for fixing in a particular position during loading and unloading the engines, with necessary wire cables and shakles of different capacity 250 kg, 500 kg, 1000 kg. Height of lifting is 10 ' (minimum).	1 set
13.	Fully Hydraulic Pallet Trucks for moving engines on work shop floor. Lift height - 120 mm, Length of fork 1120 mm (minimum), width 540 mm (minimum) - capacity 500 kgs.	3 Nos.
14.	Fully Hydraulic Pallet Truck for moving engines on work shop floor. Lift height - 120 mm Length of fork 1120 mm (min.), width 450 mm (min.), Capacity 1000 kg.	3 Nos.
15.	Portable type two stage air compressor, compressor and electric motor mounted on air vessel with necessary gauges for measuring Air pressure, temperature etc. Vessel capacity 1000 cft, Compressor 15 bar, Compressor speed 750 per minute, with all accessories for about 200 ft. air hose line with 10 Nos. of air points and air jets.	1 set
16.	Electric Heating Plate for warming up engine parts during assembling. 400 x 300 x 200 mm in steel cabinet. Temperature 0 to 200 C	1 Nos.

17. Engine mounting stand for assembling the BDP made Deutz Diesel Engines type FL 912 series 2 to 6 cylinder — 4 Nos.

18. Valve seat cutting tool set complete with steel box. Pilot guids, draw in collects, chucks and other accessories for valve seat dia 85-90 mm, shaft dia 8 - 18 mm, Rest for 30 - 45 angle — 5 sets

19. Diesel Engine compression pressure tester with connections for BDP made Deutz Enginge, Typ F1L 210 D, F1 912 series. Capacity 10-40 Atm. — 5 sets

20. Honing attachment for manual honing of engine cylinder liners, to be clamped into hand Drill machine, 350 to 850 RPM, Flexible/unbreakable — 2 sets

21. Tachometer, Measuring range 0-10000 RPM with 3 adapter pieces, in a box, to measure engine speed, with digital display for reading the RPM. — 25 Nos.

22. Electric marking pen, complete set with accessories for marking on steel parts. — 2 sets

23. Injection Nozzle testing device complete with diesel fuel container, pressure gauge and different types of thread connectors for various types of injectors, Pressure range 0 - 400 bars. — 5 sets

24.	High pressure hand delivery pumpe for checking the start of delivery of the high pressure fuel injection pump of diesel engines (for checking the injection timing).	5 sets
25.	Helicoil box (right hand thread) set with all accessories and special threading taps from 5M to 12M.	25 Nos.
26.	Helicoil inserts M6x9, M8x12, M10x15 M12x18	2000 each size
27.	Puller, double armed for pulling off gears, ball bearings etc. from shafts. Capacity-120 mm reach - 100 mm.	5 Nos.

C. LIST OF TOOLS

1.	Complete set of hand tools with tool box for Diesel engine servicing in the field.	25 sets
2.	Grip plairs 250 mm long	25 Nos.
3.	Allen key set 2 to 14 mm, 10 pcs. (set in plastic cover)	25 sets
4.	Belt spanner with aluminium handle (belt size 500 x 50 mm)	25 Nos.
5.	Chain spanner with pipe handle and locking arrangement (800 mm long Chain)	25 Nos.
6.	Universal piston ring plairs	25 Nos.

7.	Outside Micrometer, accuracy 0.05, measuring range 0 - 25 mm.	5 Nos.
8.	Outside Micrometer accuracy 0.05, measuring range 25 - 50 mm.	5 Nos.
9.	Outside Micrometer accuracy 0.05, measuring range 50 - 75 mm.	5 Nos.
10.	Outside Micrometer accuracy 0.05, measuring range 75 - 100 mm.	5 Nos.
11.	Outside Micrometer accuracy 0.05, measuring range 100 - 125 mm.	5 Nos.
12.	Inside Micrometer accuracy 0.05, measuring range 40 - 50 mm.	5 sets
13.	Inside micrometer with dial gauges, in wooden box, set with setting rings Range 50 - 100 mm 100 - 160 mm set in one box	5 boxes
14.	Precision dial gauge Reading 0.01, Range 0 - 100 mm	10 Nos.
15.	Magnetic stand for dial gauge measurement magnetic base 50 - 35 - 25 mm.	5 Nos.
16.	Nylon hammer with replaceable facing of 50 mm dia.	25 Nos.
17.	Spare face for Nylon hammer 50 mm dia	100 Nos.

18. Vernier Calipers, non rusting with points for internal measurement and depth measurement	Measuring range up to 150 mm.	25	Nos.
19. Depth Gauge	250 x 75 x 7 x 4	25	Nos.
20. Spirit Level (Metalic-Frame)	300 mm long	25	Nos.
21. Set of Ring & Open ended Spanner.	11 pieces of 8x8, 9x9,10x10,11x11, 12x12,13x13,14x14, 15x15,17x17,19x19, 22x22	25	sets
22. Heavy Duty Ringand openended Spanner	27 x 27	25	sets
23. As above	30 x 30	25	sets
24. As above	32 x 32	25	sets
25. As above	36 x 36	25	sets
26. As above	41 x 41	25	sets
27. Socket Spanner Set 1/2" Sq. drive, 19 nos. soket & 5 nos. different accessories (Ratchet, Extension Universal Joint & T-Handle)	10,11,12,13,14,15, 16,17,18,19,21,22, 23,24,26,27,28,30, 32 mm	25	Boxes

28. Heavy duty socket 1/2" Sq. drive	36 mm (3/4" Sq.drive)	25	Nos.
29. As above	46 mm - " -	25	Nos.
30. As above	55 mm - " -	25	Nos.
31. As above	75 mm - " -	25	Nos.
32. Extensions for 1/2" Sq. drive socket	200 mm long	25	Nos.
33. Cross grip (T-handle) 3/4" Sq. drive.	510 mm long	25	Nos.
34. Adapter for socket 1/2" outer 3/4" inner	1/2 x 3/4"	25	Nos.
35. Phillips screw driver	Size - 1	25	Nos.
36. As above	Size - 2	25	Nos.
37. Cerclip Pliers, straight external	Size - A 2	25	Nos.
38. As above, offset, external	Size - A 21	25	Nos.
39. As above, straight, internal	Size - J 2	25	Nos.
40. Oil Stone	200 x 20	25	Nos.
41. Needle file set	12 different forms	25	Nos.

42. Triangular scraper	150 mm long	25	Nos.
43. Hand Tap set of 4 Nos. Rough, Medium & Fine cut. H.S.S.,	M5	25	Nos.
44. As above	M6	25	Nos.
45. As above	M8	25	Nos.
46. As above	M10	25	Nos.
47. As above	M12	25	Nos.
48. As above	M14	25	Nos.
49. As above	M16	25	Nos.
50. Tap handle	4 mm - 16 mm	25	Nos.
51. Tap holder ratchet model 2 Jaw Chuck	4 mm - 16 mm	25	Nos.
52. Threading Die (150 Std)	M6 (Set of 3)	25	Nos.
53. As above	M8 - " -	25	Nos.
54. As above	M10 - " -	25	Nos.
55. As above	M12 - " -	25	Nos.
56. As above	M14 - " -	25	Nos.
57. As above	M16 - " -	25	Nos.
58. Die handle 150 Std.	M6 - " -	25	Nos.

59.	As above	M8	25 Nos.
60.	As above	M10	25 Nos.
61.	As above	M12	25 Nos.
62.	As above	M14	25 Nos.
63.	As above	M16	25 Nos.
64.	Feeler gauge. 20 blade.	0.05-1.00	25 Nos.
65.	Steel Tape (Small)	2 meter long	25 Nos.
66.	Screw driver (Plastic-handle)	2.3x80 mm	25 Nos.
67.	As above	4.5x100 mm	25 Nos.
68.	As above	7.00x140 mm	25 Nos.
69.	As above	10.00x180 mm	25 Nos.
70.	Hammer ball pin	1 lb.	25 Nos.
71.	As above	2 lb.	25 Nos.
72.	Hammer sledge	5 lb.	25 Nos.
73.	Cold chisel flat	1"x8"	25 Nos.
74.	Cold chisel flat	1/2"x6"	25 Nos.
75.	Nose Pliers	8"	25 Nos.
76.	Pipe wrench	12"	25 Nos.

77.	Set of letter punches	3 mm	25	sets
78.	Set of figure punches	3 mm	25	sets
79.	File flat 2nd. cut	8"	25	Nos.
80.	As above smooth	8"	25	Nos.
81.	File round 2nd. cut	8"	25	Nos.
82.	File round 2nd. cut smooth	8"	25	Nos.
83.	File triangular 2nd cut	8"	25	Nos.
84.	As above smooth	8"	25	Nos.
85.	Scissor's for metal	10"	25	Nos.
86.	Centre punch	6"	25	Nos.
87.	Hack saw frame	12"	25	Nos.
88.	Hack saw blade	16 T.P.I.	25	Nos.
89.	Oil can	Medium size	25	Nos.
90.	Grease gun	-	25	Nos.
91.	Table vice	8" face	25	Nos.

D. LIST OF TRANSPORTATION FACILITIES

1.	Four wheel drive diesel service Van for transportation of experts and BDP engineers along with tools and spares to facilitate field service and training on engines in the field	2 Nos.
2.	75 C.C. Motor cycle with carrier and tools for field training	10 Nos.
3.	Electric Typewriter	2 Nos.