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CONSOLIDATED FINAL REPORT

Establishment of a Pump Repair Section within the Existing Mechanical Workshop and Foundry

in

M O G A D I S C I O .

Fritz Werner

UNIDO Contract No. 83/23

Project No. US/SOM/80/083

Wiesbaden, 31st January, 1985

SYNOPSIS

Field studies in the Project Area, carried out upon the award of contract, turned up a clear picture of the requirements for the project, including civil construction material for the improvement of working Conditions in the Workshop building, determined to accomodate the future Pump Repair Section.

Files and data of pumps installed or existing in Somalia were not available from the different Ministries and Agencies in charge of hydroeconomy. It was therefore decided to have the demand of imported pump spare parts determined empirically and requested for by the technical advisor to be delegated to the Project Area. In the same manner the requirement of spares and tools for the recovery of equipment already existing was to be defined.

Respective proposals were made to UNIDO in Fritz Werner's Preliminary Report of 18.7.1983 and accepted.

After detailed planning and after having passed the tendering and approval procedure supplies of equipment for the project were made by Fritz Werner in 3 partial shipments between 29.12.1983 and 9.3.1984. A project vehicle was procured thro gh UNIDO and shipped by Fritz Werner on 11.2.1984. It was available for the project from 21.4.1984 onwards. Supplies of spares and tools after identification in the project area were made in 6 part shipments between 28.7.1984 and 10.5.1985. After approval by UNIDO an unscheduled delivery of structural steel ruled to be part of local contribution to the project, but not made available, out of the project funds was shipped on 4.1.1985.

Training of Somalian personnel in Germany was rendered to 3 employees of Foundry and Mechanical Workshop between 1st August and 30th November 1983. There were some problems of understanding as only one of the 3 persons had a good capability of the English language. Later, only one of the trained employees was full-time engaged for the project.

Fritz Werner's Technical Advisor arrived in the project area on 28th February, 1984, scheduled to return to Germany 12 months later. This stay had to be extended until 30th June, 1985 as the project had run into heavy delay. The tentative work programme of the advisor during his stay in Somalia had been: supervision of installation of equipment for a period of 2 months; rendering of pump repair training for a period of 10 months thereafter. Actually the installation of the final portion of equipment lasted to June 1985.

A full-scale pump repair training could not be rendered by the advisor because, during the entire period of his assignment, an insufficiant number of 11 pumps only of 2 different types were delivered or collected. This circumstance together with the unavailability of pump documentation frustrated definition of imported spare parts stocks. Actual repair could be performed on 1 of the 11 pumps only. The other pumps had electrical defects or were badly worn needing replacement of parts and repair by deposition welding. Pump spares made by the foundry had to be rejected for lacking quality and acetylene for welding was not available. For pump testing, final stage of pump repair, a pump test stand had been supplied and installed by June, 1985, but was not taken into operation to avoid corrosion after the departure of the Technical Advisor from the project area.

The heavy delay of project implementation has to be attributed mainly to bottlenecks of local material supplies and services, to frequent power shortage and - interlinked with the other main factors of delay - a low work efficiency of too little local manpower input.

A detailed description of project development/implementation, of supplies made, of services rendered and of expenditure made for the project are given in chapters 3 to 8 of this report.

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PRELIMINARY SECTION

1. INTRODUCTION/CHRONOLOGY

1.1 Contractual Basis

Under UNIDO ref. no. 83/23, Project No. US/SOM/80/083, Activity Code US/01/31.9, a contract "for the provision of services relating to the Establishment of a Pump Repair Section within the Existing Mechanical Workshop and Foundry in Mogadiscio in the Democratic Republic of Somalia" was concluded between

UNIDO
United Nations Industrial
Development Organization
Vienna, Austria

and

FRITZ WERNER EXPORT GMBH
Wiesbaden, Federal Republic
of Germany

whose legal successors have become, effective May 14, 1985, FRITZ WERNER INTERNATIONAL GMBH

1.2 Scope of Contract

Within the scope of the contract, the following missions had to be accomplished:

a) Briefing/Debriefing in Vienna to a total of 4 man-days

Briefing in Vienna was given to Mr. Anton, Mr. Kramer and Mr. Sonntag from April 27th to April 28th, 1983. Further reporting

visits to UNIDO Vienna were made as hereafter:

- Mr. Anton, Mr. Kramer, Mr. Sonntag on 7th July, 1983
- Mr. Sonntag on 27th January 1984
- Mr. Anton, Mr. Sonntag on 14th November 1984

b) Field studies to a total of 0,5 man-months

Studies were carried out by

Mr. H.R. Anton,	Project Manager (Fritz Werner)
Mr. W.M. Kramer,	Deputy Project Manager (Loewe)
Mr. H.R. Sonntag,	Area Sales Manager (Fritz Werner)

from May 21st to May 29th, 1983, for the purpose of obtaining project relevant information and planning data in the project area.

c) Planning and supplying equipment for pump repair

Suggestions of supply were made in Fritz Werner's Preliminary Report of 18th July, 1983 and accepted by UNIDO.
Delivery of equipment and materials out of the project hardware funds by Fritz Werner started 29-12-1983 and ended 6-5-1985.
A partial amount of some US-$ 7.400,-- for pump spare parts remained unspent as determination of spares requirement was not possible during the mission of Mr. Bender.

d) Training of Somalian personnel in pump repair to a total of 10 man-months

Training was given to 3 gentlemen from Foundry & Mechanical Workshop in Germany from August 1st to October 31st (2 persons) and

August 1st to November 30th respectively (1 person) at Messrs. Loewe Pumpenfabrik GmbH, 2120 Lüneburg, F.R. Germany.

e) Technical Assistance in the Project Area for a duration of 12 man-months

Technical Assistance, comprising installation of newly supplied equipment and on-the-job-training in pump repair, had to be rendered for a period of 16 months from 1st March, 1984 to 30th June, 1985, due to heavy delays of the project. The services were performed by Mr. Klaus-Otto Bender, master-mechanic and head of the pump repair department of Messrs. Loewe Pumpenfabrik.

f) Reporting to UNIDO

Fritz Werner have fullfilled their contractual obligations of reporting, though sometimes delayed, the delay going onto the account of an underdeveloped communication system in the project area. On top, Fritz Werner have delivered monthly Training Progress Reports to UNIDO, not subject of the Contract.

1.3 Further services rendered by Fritz Werner beyond the contractual scope

Inspection journeys to Mogadishu for the sake of the project were made by Fritz Werner personnel to the following scheme:

- Mr. Sonntag: 27th November to 2nd December, 1983
- Mr. Anton: 25th February to 2nd March, 1984
- Mr. Sonntag: 30th August to 5th September, 1984
- Mr. Sonntag: 23rd November to 2nd December, 1984
- Mr. Anton, Mr. Sonntag: 14th January to 21st Janurary, 1985 (together with Mr. Fritz, Mr. Tompkins of UNIDO)
- Mr. Sonntag 23rd to 27th November, 1985

1.4 Acknowledgements

Thanks are expressed on this occasion to all counterparts, bodies

and authorities engaged in the project, for their help, support and cooperation.

Very special thanks are given to Mr. Bender's Somalian technical counterparts, the Works' Engineer in charge and the foreman of the Mechanical Workshop/Pump Repair Shop, and to the Chief Technical Advisor and his crew, delegated to FMW under UNIDO Metallurgical Department sponsorship. Without their help and willingness the project would not have attained the stage at which it was left by Mr. Bender on 30th June, 1985.

2. PROJECT BACKGROUND

The award of the above UNIDO Contract goes back to Fritz Werner Export's bidding to UNIDO Request to Proposal P 82/18, issued 28th May, 1982, the outlines of which have been basing on the "Study for Progressive Local Manufacture of Pumps (Supplementary Assistance to the Mechanical Workshop and Foundry) in the Somali Democratic Republic" prepared by Messrs. Kienbaum Beratungen GmbH in January 1980, and proposing a stepwise local production of pumps in Somalia in several phases. The study has been available for Fritz Werner since end of April 1983.

The said UNIDO Contract has covered phase No. I of the step-programme suggested by Messrs. Kienbaum:
Supply of equipment and mediation of know-how for mechanical pump repair utilizing locally produced spares, where-ever possible.

The results of the field studies during May 1983 required some corrections to be made to the original proposal.

BODY

3. FOUNDRY & MECHANICAL WORKSHOP: DESCRIPTION OF STATUS ON 30.6.1985

3.1 Real Estate and Buildings

Of the entire factory area of approx. 50 000 sq.m. less than 10 % were covered with buildings, during the first visit to the project, existing main buildings being:

administration building
foundry / steel structure workshop
mechanical workshop,

civil construction mostly masonry (cement lime sand blocks) with some concrete reinforcement, roofing by means of corrugated asbestos cement sheets. During the project phase (about end of 1983/begin of 1984) a storage building was going to be put up and the brickwork was set somewhat around mid of 1984. At the end of the reporting period the building still lacked its roof.

3.1.1 Administration building

There has been no thorough-going change vis-à-vis the status found in May 1983 and described in the Preliminary Report. Some of the office rooms are still used for storage of ready goods and scrap, worn-out office furniture and office machines. The outfit of furniture and office machinery and their standard is still generally poor. Sanitary facilities are still out of use or in poor condition.

3.1.2 Foundry

The foundry building and its surroundings were found in a saddening condition during the visits made in 1983 to the project area by Fritz Werner delegates. Things have changed to the better since begin of 1984 under the influence of

Dr. Nihat Kinikoglu and his team, assigned to Foundry and Mechanical Workshop under UNIDO - Metallurgical Department-Development Aid.

3.1.3 Mechanical Workshop

The building is a one-nave construction which covers an area of approx. 600 sq.m., inner width approx. 12 m, length approx. 50 m. Side and gable walls are made of hollow block masonry (block dimensions 40 x 20 x 20 cm) up to an eaves height of abt. 4,20 m. Roof stanchions every 3,85 m and consisting of a double row of hollow blocks, filled with reinforcement steel and concrete, carry a light steel gable roof framework of abt. 13.5° inclination. Roofing, by means of corrugated asbestos cement sheets (some of which were found torn in May 1983).

4 rows of brick perforations in the upper portion of the side walls created some natural air circulation, together with openings in the upper part of the gable walls. The building is entered through 2 doors approx. 3,20 m wide and 3,00 m high on the side wall facing the foundry building. Windows did not exist during the first inspection in May 1983. Some fluorescent lamps and overhead fans were installed to improve illumination and ventilation. The floor coat was a thin layer of lean concrete.

It broke up almost completely after March 1984 when newly supplied equipment and re-positioned existing machinery were transported in the hall, requiring total recovery.

At the end of the reporting period the building had been brought in to an upgraded condition allowing an undisturbed work flow. Measures taken were:

- Daylight illumination by installation of glass brick rows in the side and gable walls of the building
- Improvement of ventilation by installation of perforated bricks below the glass brick rows of the front side wall
- erection of a shop office within the building
- separation of a storage area by means of a mesh wire fence
- laying of a new concrete hall floor of abt. 8 cm thickness
- mending of the roof leaks.

3.1.4 Infrastructure

There has been no change vis-à-vis the state described in the Preliminary Report.
The factory estate is fenced all around and is entered through a guarded gate from "21st October Road", a good quality tarmac road. Part of the internal factory roads are macadam but mostly sand ways without asphalt pavement. The ground and part of the ways are weed-overgrown. Scrap including run-down vehicles and raw material can still be found at many places.

3.2 Energies and media

3.2.1 Electric energy

Incoming electric energy of 150 kVA 50 Hz from the public power line is stepped down to 380/220 V (without protective conductor) in an own transformer station. Voltage fluctuations can go as high as ± 20 %, power shortage occurs frequently. Distribution of energy to 5 switchboards (2 of which in the mechanical workshop) of 14 fields each, every field fused to 25 A.
All machinery of the Mechanical Workshop/Pump Repair Shop was connected electrically by the end of the reporting period, with the exception of bandsaw item 14.1 (motor still to be installed). Additional single phase A.C. sockets were installed to feed the electrical hand tools newly supplied.

3.2.2 Water

Water is delivered from an own well to a water tower, water supply lines in May 1983 were found to go to the administration building and the foundry and to some outside taps, the mechanical workshop being not connected. Water mountings were partly not functioning. A water supply line was laid into the building during the reporting period delivering water to the pump test stand.

3.2.3 Compressed air

A compressor station is supplying compressed air to the foundry. A small mobile compressor (motor burnt out) but no supply line was existing in the mechanical workshop. A compressor, pipes and accessories were supplied from the project funds and installed during the Reporting Period. Compressed air is available now at the pump test stand and in every section of machining within the building.

3.3 Equipment

3.3.1 Foundry

A description of state of foundry equipment at the end of the reporting period is abstained from, as detailed reporting has been done by Dr. Nihat Kinikoglu.

3.3.2 Steel Structure Department

The machine pool is unchanged against the list attached as annex 1 to the Preliminary Report. All machines are in working order, part of them having been repaired by Mr. Bender during

his stay in Somalia. With the consent of the FMW management the universal milling machine (No. 6) was to be transfered to the Workshop/Pump Repair Shop building. Foundations have been laid their already, but the shifting could not be carried out due to the forklift having been out of working order since January 1985.

3.3.3 Mechanical Workshop / Pump Repair Shop

3.3.3.1 Layout No. 2700-1 a attached to Preliminary Report as annex 2 depict the approximate positioning and main data of machine tools installed in the mechanical workshop originally. As an average figure, their maintenance standard could be put to 60 to 80 % in May 1983. Some machines were out of or in partly working order only as they lacked cutting tools or spare parts, or since their electric systems had collapsed.
The outfit standard of tooling, fixtures, measuring instruments and adjuvants/running material was extremely poor. Tool and fixture storage facilities were short and of low standard. All machines required cleaning and most of them needed adjustment and repair.

3.3.3.2 All equipment installed, as well the items newly supplied under the project, as the ones already existing in the begin of Mr. Bender's mission or the items manufactured by FMW personnel during his assignment were left in mechanical working order and tidied-up end of June, 1985.

3.3.3.3 Equipment though installed and in working order which cannot be operated by FMW personnel of their own:

- Pump test stand
  reasons: On-the job training could not be given due to heavy delays in installation
- Deposition welding appliances
  for pump shaft recovery: reasons: on-the-job training could not be rendered as acetylene was unavailable during the entire reporting period

3.3.3.4 Equipment though installed and in mechanical working order, needing further appliances for proper use:

- Tool grinding machine (it 12.1 of the layout No. 2700-5); reasons: a) coolant system for which a coolant pump was supplied under the project has to be completed by FMW, b) grinding wheels (and fixtures, if any) still have to be determined
- Hack saw (it 14.4 of layout No. 2700-5) needs completion of coolant system (pump supplied under project deliveries)
- Band saw (it 14.1 of layout No. 2700-5) needs replacement of drive motor (supplied under the project)

3.3.3.5 A detailed description of machinery, equipment, tools and materials, supplied by Fritz Werner under the project is given in chapter 7

3.4 Means of Transport

3.4.1 Transportation of personnel and material

One medium size bus (abt. 25 seats) and one lorry have been available in the reporting period. During a great deal of the time the vehicles either could not be used or with restricted radius of action only for reasons of

- repair
- shortage of Diesel Oil

3.4.2 Lifting/hoisting equipment

The 4 ton forklift of FMW was not working most of the time between March 1st 1984 and June 31st, 1985. From January 1985 to the end of the reporting period it was permanently out of order.

3.4.3 Project vehicle VW Kombi

The vehicle was used by Mr. Bender from 21st April 1984 to the end of his mission and handed over on 31st June 1985 to Mr. Issan and Mr. Levant, experts with the foundry under contract of UNIDO Metallurgical Department.

3.5 Communication

A reliable telex line to or from FMW (via the nearby Cigarette Factory) did not exist at the end of the reporting period.

3.6 Personnel

3.6.1 Management

There was no change in management positions during the reporting period.
General Manager: Mr. Mohamed Ali Dahir
Technical Director: Mr. Abdulahi Ismail Hussen
Commercial Director: Mr. Abdulahi Mohamud Mohamed

3.6.2 Works Engineer in charge of the Mechanical Workshop/ Pump Repair Shop

There were some changes:
Mr. Mohamed Ali Ibrahim acted as Works Engineer from March until begin of July, 1984. He returned to the Ministry of Transport. The job was trust-held by Mr. Hersi, Foundry Engineer

until Mid of September 1984. From October 1984 to the departure of Mr. Bender Mr. Suleiman Abdilahi Giama was appointed Works Engineer.

3.6.3 Workshop Personnel

In March/April 1985 the number of employees had shrunk from 12 to 9 persons. It remained unchanged until the end of the reporting period.
Names of persons employed in the workshop on 31st June 1985:

Mr. Abdulkadir Jama Abas , foreman, trained in Germany
Mr. Abdir Saad Hussen Hassan
Mr. Abdulahi Mohamed Hassan
Mr. Abdir Saad Hashi Gur
Mr. Awil Ali Malane
Mr. Ali Abdulkadir Nur
Mr. Abdir Mohamed Ismail
Mr. Abdir Mohamed Fahra
Mr. Mohamed Abdir Mohamed

3.7 Standard of Mechanical Skills

3.7.1 FMW personnel trained in Germany

Of the 3 employees trained in Germany only Mr. Abdulkadir Jama Abas was full time working with the Pump Repairshop Project (Mr. Mohamed Hussen Hassan being employed as a welder, Mr. Mohamud Ahmed Togan having been under arrest since March 1984). He can be regarded a qualified mechanic and able to cope with his job as the foreman of the workshop.

3.7.2 FMW personnel trained on the job

Of the 8 persons (besides Mr. Abas) employed in the Workshop/ Pump Repair Shop 4 have attained a fair knowledge of machining

and assembly works which allows them to work independently. The remaining part of workers need instruction and supervision by their superior.

3.8 Standard of Theoretical Knowledge

3.8.1 Mathematics and Technical Drawing

Mr. Bender held lessons in this discipline from begin of February to end of April 1985. He was succeeded by Dr. Nihat Kinikoglu (Chief Technical Advisor assigned to FMW by UNIDO Metallurgical Department) who took over then. The knowledge gained by part of the FMW personnel up to the end of the reporting period allows for reading and drawing of technical drawings and for technical calculations (Part of the personnel did not attend the lessons regularly).

3.8.2 Pump Technology

Lessons were held by Mr. Bender regulary from 1st November 1984 (after the first repairworthy pumps had been delivered to FMW) onwards up to the end of his mission in average 1 hour per working day. It can be said that concrete subjects such as operation principles and functions of the different pump types that could be demonstrated were well understood. However, must be stated that abstract themes such as geodetic suction height and performance graph could not be mastered.

3.9 Pump Repair and Repair Training Activities

3.9.1 Repairworthy Pumps delivered to the Workshop

Between end of October 1984 and 31st June, 1985, only 11 repair-needing pumps were delivered to FMW - most of them by initiative of Mr. Bender - 3 of which were centrifugal pumps, the rest

being submersible pumps

3.9.2 Pumps repaired in the Reporting Period

1 centrifugal pump could be repaired; it needed only thorough cleaning. The major part of pumps remained unrepaired for the following reasons:

- total corrosion
- electrical defects
- no spare parts at hand
- recondition by deposition welding being impossible due to lack of acetylene.

3.9.3 Spare Parts Situation

3.9.3.1 Imported spare parts

One main target during the full mission of Mr. Bender, determination and stock ordering of spare parts, could not be attained within the reporting period.

3.9.3.2 Home produced spare parts

Attempts made in the reporting period to produce spares (runners, impellers) in the foundry failed because of quality problems.

3.9.4 Pump Repair Training Items

Repair training during the reporting period more or less was confined to dismantling, cleaning and re-assembling of 2 pump types: submersible pumps and centrifugal pumps.
Deepwell turbine pumps and piston pumps in need of repair were not available. The working principle of piston pumps and their

components could be demonstrated through Mr. Bender by means of a sorted-out piston compressor and a manually operated piston pump borrowed from a friend of his.

3.9.5 Pump Repair Equipment on which no Training could be rendered

3.9.5.1 Pump Test Stand

The pump test stand was completed end of June 1985, only. Its commissioning would have created severe stand-still damages by residual water corrosion after the departure of Mr. Bender.

3.9.5.2 Deposition Welding Equipment

The equipment and the materials, necessary for reconditioning pump shafts could not go into operation as acetylene was untraceable in Somalia in the reporting period.

3.10 Illustration of Status on 30.6.1985

3.10.1 Outside views of the Workshop/Pump Repair Shop Building

Drawing No. 2700-2B, enclosed as annexure 1 to this report, depicts the as-built situation of the building after the installation of glass and perforated bricks for the improvement of daylight illumination and ventilation.

3.10.2 Workshop Layout

Consolidated layout No. 2700-5 illustrates as-built status of the Workshop/Pump repair shop.

- final position of machines and main equipment
- situation of water and compressed air supply lines
- situation of electric power connections
- power rating chart
- final design and position of shop office
- situation of store fence

The layout and its legend are enclosed as annexure 2 to this report.

3.10.3 Reference documents

Annexure 3 to this report contains layout No. 2700-1a and its legend, depicting the original equipment situation of the Mechanical Workshop as found during Fritz Werner's first inspection trip to the project area in May, 1983. The list of equipment installed in the Steel Structure Department and employable also for use by the Mechanical Workshop/Pump Repairshop is also part of annexure 3.

3.10.4 Photographs

Photographs documenting the original status of the project and the stages of progress were taken

- in May 1983
- in February/March 1984
- in January 1985
- in June 1985

A choice of pictures are enclosed as annexure 4 to this report.

Another series of pictures depicting the final status of the project, and also contained in annexure 4, were taken in November 1985.

4. STEPS/CHRONOLOGY OF PROJECT IMPLEMENTATION: PLANNING PHASES

4.1 Initial Planning Phase

On 17th December 1982 Fritz Werner Export GmbH. submitted to UNIDO, Vienna, their final offer, ref. VK-SOM/A-5239 on supplies and services for the establishment of a pump repair section within the existing Foundry and Mechanical Workshop at Mogadishu/Somalia

4.1.1 Basis of Planning

Fritz Werner's planning based on UNIDO Request to Proposal P 82/18 issued 28/5/1982 and the tender documents attached to it, in particular appendix 1 with its annexes I to IV as part of the Kienbaum Study referred to in article 2 of this report. The overall contents and the critical remarks of this study were not known to Fritz Werner at this time.

4.1.2 Results of Planning

Assuming a fair state of the machinery already existing

in the Mechanical Workshop, of utilities supply, of building and infrastructure, trusting in a halfways working statistical and registration system in Somalia and following the recommendation given in the tender documents, Fritz Werner came to the following conclusion:

4.1.2.1	Additional machinery and equipment (including a basic tool outfit for them) to be supplied to a value of	US$ 232.500,-
4.1.2.2	Spare parts to be supplied to a value of	US$ 10.000,-
4.1.2.3	Abroad training to be given to FMW personnel to an extent of 10 man-months	US$ 36.700,-
4.1.2.4	Project Area Services to be rendered to an extent of 12,5 months	US$ 87.025,-
4.1.2.5	Home Office Engineering and Project Coordination (3 man-months), translation and reporting	US$ 44.000,-
4.1.2.6	Travelling fees (exclusive of transport within Somalia) and subsistance to be spent to an amount of	US$ 29.245,-
	totalling:	US$ 439.470,-

4.1.3 Schedule of Project Implementation

Persuant to the pen and ink knowledge gained from the available tender documents, basing on an abundance of local manpower and whilst bringing in their own experience in developping countries Fritz Werner set up a time schedule with the following targets (date of award of contract being the zero date)

- preparatory works ending after 2 months
- tendering of eqipment and spares being terminated after 3 months, purchase of same 1 week later
- shipment of equipment and spares being terminated after approx. 6 months

- expert/experts for machine installation and technical assistance being assigned to the project area in the 7th month and returning in the 18th month

- Training of Somalian personnel lying inbetween the above phase (3rd to 7th month)

4.2 Findings upon receipt of the entire Kienbaum Study and during the field Investigation.

4.2.1 Award of Contract, handing-over of the Kienbaum Study

The contract award was advanced to Fritz Werner by UNIDO telex of 21/3/1983 and telex accepted by them on 25/3/1983. The Kienbaum study was handed over to Fritz Werner during the project briefing in Vienna on 27th/28th April, 1983.

4.2.2 Findings by Evaluation of the Kienbaum Study

The Kienbaum study pinpointed the main problem areas

- Foundry and Mechanical Workshop, inaugurated in October 1975 was an uncompleted project
- Lack of tools and fixtures
- Missing instruction manuals
- Personnel lacking skills, discipline and responsibility
- Lack of local supplies
- Weak organizational structure of FMW
- Negligence of tidiness and safety precaution
- cumbersome and time-consuming bureaucratic procedures (e.g. import procedures)
- lack of statistical data
- a large variety of different makes, types, models of pumps around the country
- the workshop building lacking windows.

The study listed the main equipment installed in the Mechanical Workshop but it did not describe its state of maintenance and operational readiness.

4.2.3 Findings During the Field Mission

The field investigation in the project area from May 21st to 29th, 1983 verified major foundry equipment (which had been reported not working or not installed in the Kienbaum study) having been brought to working order in the meantime by own efforts of FMW, but having partly collapsed anew. However, were a lot of saddening conditions found in the following main fields pertaining to future pump repair. Discoveries made are listed hereafter:

4.2.3.1 State of real estate and infrastructure

- weed overgrown terrain
- scrap all around the estate
- factory roads prevailingly sand ways

4.2.3.2 State of Mechanical Workshop Building

- roof leaks
- floor in need of repair
- still no windows installed
- no shop office, no lockable store
- interior of building untidy

Contrary to the opinion uttered in the Kienbaum study, Fritz Werner's field team came to the conclusion that the building could accomodate the pump repair section after certain re-arrangements

4.2.3.3 State of sanitary Installations

- in unbearable condition

4.2.3.4 State of Mechanical Workshop Equipment

- all machinery requiring thorough cleaning
- machine tools virtually untooled
- lack of operation manuals and spare parts lists, or in languages other than English or Italian
- extremely poor outfit of fixtures, measuring tools and adjuvants
- lack of workbenches and tool cabinets

- lack of storage racks and shelves
- lack of standard hand tools
- complete lack of electric or pneumatic hand tools
- part of the machine pool having dropped out by mechanical or electrical defects
- no lifting/hoisting equipment and no small transport equipment
- shortage of running materials
- part of the machine nameplates having come-off, obstructing identification

4.2.3.5 Situation of the Foundry

- The overall state of equipment or tooling of foundry, patternshop and quality control department (laboratory) and qualification of personnel were poor.
- Foundry coke had to be substituted by charcoal during the period of field mission; the necessary melting temperature could not be attained.
- Mostly cast iron scrap of different provenience and quality was used to charge the cupolas - the quality of ready castings being unpredictable

The facts found gave Fritz Werner's field team the impression that usable pump spare parts could not be expected to be produced by the foundry.

4.2.3.6 Situation of the Steel Structure Department

- Machines also usable for pump repair works, and thus supplementing the machine pool of the Mechanical Workshop were found in a fair working order, but nearly bare of tooling
- The stock of sheet metal and welding electrodes had come next to nothing (due to import restrictions) jeopardizing the future employment of this section

4.2.3.7 Energy and Media Supply Situation

4.2.3.7.1 Electric Energy

The supply of electric energy could be anticipated to become critical, as the city power station had burned out shortly

before the field mission. The supply of electric energy had to be taken over by the power station south of Mogadishu, planned as a standby station for the petrol refinery. Voltage fluctuations were reported to go to ± 20 %.

4.2.3.7.2 Water supply

There was no water supply line going to the Mechanical Workshop.

4.2.3.7.3 Compressed Air

The Mechanical Workshop was not connected to the compressor station delivering compressed air to the foundry.
A small, mobile compressor, but no distribution system was detected in the Mechanical Workshop. It was out of order.

4.2.3.7.4 Welding gases

Autogenous welding activities could not be traced on the FMW terrain, but acetylene and oxygen were said to be available in Somalia.

4.2.3.8 Materials Supply Situation

4.2.3.8.1 Construction Material

- Cement-limestones (home made) were available on the local market
- Availability of cement was reported to fluctuate (depending on the frequency of state imports from outside)
- Windows or glass bricks (import articles) were not available from state trading corporations
- Water tubes were available on the local market (imported), but pressure-tight tubes (for the transport of compressed air) were said to be unavailable on the local market
- Constructional steel was said to be available from government trading organizations. It could be seen used in various Civil construction measures.

4.2.3.8.2 Running Materials and Standard Articles

- There were large procurement gaps (see sub-articles 4.2.3.5 and 4.2.3.6)

4.2.3.8.3 Petrol, Oil and Lubricants

Somalia has own refinery facilities. The supply situation appeared to be normal during the period of field mission.

4.2.3.9 Transport Situation

4.2.3.9.1 Field investigation personnel

Transport of Fritz Werner's field team during their stay in Somalia from and to their quaters on official duty was perfectly organized and maintained by FMW. Breakdown of vehicles in a few cases required boarding of taxis by them.

- UNDP Res. Rep. assistance in transport was confined to routine pickup from and to Mogadishu Airport and to the initial transfer of the Fritz Werner delegation from the hotel to FMW
- Valuable and effective transportation aid was rendered to the Fritz Werner team through compatriote individuals and corporative bodies.

4.2.3.9.2 Experts to be delegated to the project

The project area transport of their consulting personnel being ruled out within the scope of contract, Fritz Werner team evaluated the following possibilities:

- Transport by public bus lines: The distance from Mogadishu city (Housing area) to FMW is abt 6 km and public transportation was unreliable in terms of time and capacity. The keyfunction of the personnel engaged would not allow unpunctuality.
- Transport by UNDP Res. Rep. was ruled out with the excuse of shortage of vehicles.
- Transport by FMW was refused by them as transport capacity was not available and as this obligation had not been imposed to them by government.
- Transport by taxi would have involved an extra expenditure of some US$ 300,-- per month, not covered by the contract.

4.2.3.10 Mapower Situation

4.2.3.10.1 Number of Employees of the Mechanical Workshop, Working Hours

The number of employees was said to be 12. It could not be

verified. The exact fluctuation rate was not given. Working hours given: 6 days x 7 hours weekly.

4.2.3.10.2 Man power Requirement for the Pump Repair Department

By coarse estimation, Fritz Werner had come to the same figure as given in the Kienbaum study: 15 to 16 additional persons to maintain the pump repair section.

4.2.3.10.3 Rules of payment

Payment of the personnel was governed by state regulations which allowed a wage increase every 2 years. An incentive system was not provided for a factory department, working more or less on a job order practice. Incentives were proposed to be paid for the future pump repair personnel out of the project funds by the FMW management. The proposal had to be rejected by the Fritz Werner Team since not provided for in the contract.

4.2.3.11 Pump Situation

4.2.3.11.1 Administrative Situation

Irrigation/water distribution activities were found to be under the responsibility of various ministries/agencies/bodies

- Ministry of Industry
- Ministry of Agriculture
- Ministry of Mineral and Water Resources
- Water Development Agency
- Mogadishu Water Agency
- ONAT
- Private persons

Uniformation of water activities was said to have been discussed for serveral years.

4.2.3.11.2 Statistical figures

Files on number, make, model, type, year of make of pumps could not be traced during the field mission.

4.2.3.11.3 Pumps Maintenance and Repair

The repair shop of Water Development Agency at Mogadishu was paid a visit to. Repair was restricted to cannibalizing of pumps and refitting of useable parts won from out of work pumps.

4.2.3.11.4 Preventive Maintenance, Servicing

A system of regular servicing of pumps was not existing at the time of field investigation.

4.2.3.11.5 Pump Field Repair Service

Not existing

4.3 Revised Planning Phase - Conclusions and Consequences

4.3.1 Local Irput

Being aware of a critical supply and personnel situation Fritz Werner's field team, had prepared minutes of meeting at the end of their mission which - well in advance - described the main obligations of the Somalian counterparts:

- Civil works and procurement of other building materials (cement) for the installation of glass bricks
- Repair of hall floor and roof
- Making of foundations, channels and basins for machines to be newly supplied
- Installation of electric power, water and compressed air to new machinery
- Fencing, masonry, carpentry and joinery work within the building
- Upgrading of existing sanitary installations according to European standard for the use of FW's technical advisor
- Making available of a furnished office for the advisor
- Delegation of 3 trainees to Germany and statement of their qualification by curricula vitae.
  Minimum qualification requirement was set as follows:
  . fair capability of the english language
  . knowledge in the operation of machine tools or electric appliances
- Nomination of a Works Engineer as advisor's counterpart
- Recruitment of 15 persons for the future pump repair section
- Sending of sample pumps to Fritz Werner
- Organization of the transport of repair items to and from the pump repair shop and securing of a continuous flow of repair items.

- Procurement of locally available materials for pump repair.

A copy of Minutes of Meeting, mutually signed on 29/5/1985 is attached as annexure 5A of this report.

4.3.2 Necessary Additional Machinery and Equipment for Pump Repair

4.3.2.1 Entire Input

Sub-article 5.2.4 of Fritz Werner's Preliminary Report, dated 18/8/1983 listed the entire requirement of additional material input - local and foreign supplies - to equip the Mechanical Workshop for its future pump repair job. A copy of the sub article is attached to this report as annex 6. It ruled in further detailling of the Minutes of Meeting (refered to under sub-art 4.3.1 above) the local supplies of equipment:

4.3.2.2 Local content

4.3.2.2.1 Supervisor's and Shop Office

- glassed cabin, lockable
- filing cabinets , desks and chairs

(During the project realization phase it was decided not to use a glassed cabin as shop office, but to put it up from existing construction material)

4.3.2.2.2 Spare parts store, tool shop

- fencing, lockable doors
- working tables
- shelves

4.3.2.2.3 Reception of repairworthy pumps

- pallets

4.3.2.2.4 Diagnosis, dismantling, cleaning, painting

- cleaning basin
- working tables
- dip painting basin

4.3.2.2.5 Pump re-assembly
- working tables

4.3.2.2.6 Testing department
- test basin and shelves

4.3.2.2.7 Welding
- welding table
- filling of gas and acetylene cylinders

4.3.2.2.8 Transport and storage equipment
- storage bins
- scrap bins

4.3.3 Foreign Supplies

4.3.3.1 Project Related Recommendations

based on the findings made in the project area and described above Fritz Werner also recommended in their Preliminary report the following measures to Unido:

- to double the amount for machine and pump spare parts, which originally had been estimated to US$ 10.000,-- as a respectable sum had to be invested into the reconditioning and tooling of existing equipment
- to supply out of the project funds glass bricks and some cement for the improvement of illumination
- to supply out of the project funds seamless steel pipes and armatures for compressed air conveyance
- to supply a suitable project vehicle for transport of personnel and material and for field repair and maintenance services
- to supply an outfit of new pumps for training purpose and as stand-by items for sudden requirement
- to retain a sum of US$ 42.500,-- out of the project-funds for deliveries until Fritz Werner's advisor had been able to define the actual requirement at site

4.3.3.2 Expenditure of Foreign Supplies proposed

4.3.3.2.1 The expenditure for new equipment in the different workshop departments CIF Mogadishu was calculated by Fritz Werner as follows

	US-$
- Diagnosis, dismantling cleaning	16.000,--
- Motor inspection	2.000,--
- Pump re-assembly	12.000,--
- Testing	77.500,--
- Grinding (containing one new grinding machine to be purchased only after verification that the existing tool grinder could not be put to operation again).	25.000,--

	US-$
- Welding	8.500,--
- Tool and fixture making	6.000,--
- Smithy	8.500,--
- Miscellanous fixtures	8.000,--
- Transport and Storage equipment	6.000,--
- Electric hand tools	2.000,--
- Mechanics' and Electricians' Outfit, hand tools, tool outfit measuring instruments	12.500,--
Total for equipment	184.000,--

4.3.3.2.2 Expenditure for supplies recommended

- spare parts for pumps and rehabilitation of existing equipment	20.000,--
- glass bricks and cement	4.500,--
- seamless steel pipes and armatures for compressed air supply	3.000,--
- project vehicle	12.500,--
- outfit of pumps for training and standby	18.500,--
Grand total for supplies	242.500,--

4.3.3.3 Non Project Related Recommendation

Fritz Werner also suggested subsistence payment (US $ 18.470,--) to be made in covertible currency instead of Somalia Shillings. This would make the amount available for the purchase of running materials in need of which the foundry and the steel structure department were and which could not be bought on the local Somalian market. Fritz Werner in turn would accept payment of the materials by FMW in Somali Shillings.

The proposal was accepted by UNIDO in contract amendment No. 1.

4.3.4 Revision of Time Table

The facts found in the project area necessitated the original timetable to be revised.

Main dates were marked as follows:

- Zero date: begin of July 1983
- Specification of equipment: end of July 1983
- Tendering for new equipment: begin of July to end of August 1983

- ordering of new equipment: until end of September 1983
- delivery of equipment and spares
  CIF Mogadishu: begin of October 1983, to end of January 1984
- execution of civil construction
  works by FMW: begin of December 1983, to end of February 1984
- training of Somalian personnel in Germany:
  begin of August to end of November 1983
- assignment of technical advisor to project area:
  begin of January to end of December, 1984
- definition of spares and accessories for rehabilitation
  of existing equipment and of pump spares; tendering and
  evaluation of tender's:
  begin of February to end of April 1984
- ordering and CIF delivery of rehabilitation equipment and
  Pump spares: mid of May to end of August, 1984

UNIDO followed this revised time schedule and made it part of contract amendment No. 1.

5. STEPS/CHRONOLOGY OF PROJECT IMPLEMENTATION: EXECUTION PHASES

5.1 Supply of Determined New Equipment for Pump Repair

5.1.1 Tendering Procedure
Machinery and Equipment (Standard)

5.1.1.1 Tendering for most of the equipment planned as under 4.3.2.1 had been concluded in August 1983 and a first appraisal had been given to UNIDO on 30.9.1983. Contrary to the original intention, the equipment list contained an air compressor as the capacity of the existing one would not suffice to operate the sand blast equipment. The letter was answered by UNIDO letter RT/Sb dated 18.10.1983, giving approval to the majority of Fritz Werner's choice of suppliers. 2 questions put in Unidos letter concerning the procurement of the project vehicle and the driving system of standby pumps, put back slightly the ordering of these items.

5.1.1.2 Custom built pump test stand

The evaluation of tenders for the pump test stand was submitted to UNIDO by Fritz Werner's letter dated 25.10.1983 which also answered the question raised by UNIDO on 18th October, 1983. UNIDO accepted the proposed test stand offer by telex No. 0295 dated 4/11/1983. The tendering procedure for the pump test stand had to be repeated after 3 suppliers addressed in the first round had abstained from quoting.

5.1.1.3 Project vehicle

There was further correspondence concerning the purchase of the project vehicle. As Fritz Werner was unable to obtain as high a discount from Volkswagenwerk as was given to UN agencies it was decided to have the VW Kombi bought through UNIDO directly and to deduct the respective amount from the project funds.

5.1.1.4 First outfit of universally applicable pumps spare parts

The final portion of supplies already determined under 4.3.3.2.2 comprised an outfit of universally employable pump spares. Tender evalution was submitted to UNIDO by Fritz Werner letter dated 12/12/1983. Their choice was accepted by UNIDO letter of 6th January, 1984 (advance approval was given by telephone on 5/1/1984).

5.1.2 Ordering procedure

5.1.2.1 Equipment

All equipment was ordered in November 1983. Copies of Fritz Werner's purchase orders were submitted to UNIDO by letters of 10/11/ and 24/11/1983.

5.1.2.2 Project Vehicle

The direct UNIDO purchase order was placed with Volkswagen on 29/12/1983.

5.1.2.3 First outfit of pump spare parts

Fritz Werner's purchase order was made out on 6/1/1984.

5.1.3 Shipment, Shipment Values

Delivery of all determined equipment, of pump spares, and of the project vehicle CIF Mogadishu was effected in 3 partial shipments.

5.1.3.1 First shipment

sailed 29/12/1983 on MS "TAGAMA" containing tools, transport equipment, glass bricks, cement and standby pumps, packed in 3 one-way containers, covered by Fritz Werner invoice No. 46003 dated 30/12/1983, total value DM 219.216,87 ot US-$ 80.863,08

5.1.3.2 Second shipment

sailed 11/2/1984 on MS "ALTAVIA", containing compressor, measuring instruments and outfit of universal pump spares, and project vehicle VW Kombi under direct UNIDO order packed in 1 container and 1 case, covered by Fritz Werner invoice No. 46005 dated 16/2/1984, total value DM 37.561,30 or US-$ 13.997,34

5.1.3.3 Third shipment

sailed 3/3/1984 on MS "MANGAN", containing pump test stand and remaining stand-by pumps, packed in 1 container covered by Fritz Werner invoice No. 46007 dated 9/3/1984, total value DM 213.713,-- or US-$ 79.681,11

5.1.3.4 Total value of the 3 shipments

CIF Mogadishu DM 470.491,17	US-$ 174.541,53
+ Expenses by UNIDO for VW Kombi	US-$ 8.094.41
	US-$ 182.635,94

The total US-$ value of items supplied was abt. US-$ 15.000,-- cheaper than the forecast expenditure in sub-article 4.3.3.2 of this report although a new compressor had been added to the equipment subsequently. This effect went back to the

higher US-$ exchange rate since July 1983.
It left an unspent balance for project supplies still to be determined at site (grinding machine, pump spares, items for reconditioning of existing equipment) of some US-$ 59.850,--

5.1.4 Arrival at Project Site

5.1.4.1 First shipment

Shipment No. 1, having arrived in Mogadishu port end of January 1984, was cleared through customs and delivered to FMW on 1/3/1984.

5.1.4.2 Second Shipment

Shipment No. 2, having arrived at the landing port early March 1984, was cleared through customs and delivered to site on 21/4/1984.

5.1.4.3 Third Shipment

Shipment No. 3 arrived begin of April at Mogadishu and was cleared through customs and delivered to FMW on 20/5/1984.

5.2 Training of Somalian Personnel in Germany

5.2.1 Time and Place of Training

Training was held in accordance with the revised timetable between begin of August and end of November 1984, at Messrs Loewe Pumpenfabrik GmbH, Lüneburg. In charge of the training was Mr. Klaus Otto Bender, disignated future advisor in the project area.

5.2.2 Persons Trained and Tentative Individual Training Periods

Persons advised by FMW were intended to be trained as follows:

Mr. Mohamed Hussen Hassan, born 1952, electrician, 4 months

Mr. Abdulkadir Jama Abas, born 1936, mechanic, 3 months

Mr. Mohamud Ahmed Togan, born 1957, mech[illegible], 3 months

5.2.3 Required Qualification

Minimum qualification was defined in the Minutes of Meeting of 29.5.1983:

- fair capability of the English language
- knowledge of operation of machine tools (mechanics)
- Knowledge of operation of electrical appliances (electrician)

5.2.4 Tentative Training Programme

The tentative training programme is attached as annexure 7 A to this report.

5.2.5 Actual Qualification

5.2.5.1 Language

Of the English language only Mr. Abdulkadir Jama Abas had a good knowledge. Mr. Mohamed Hussen Hassan understood some English, Mr. Mohamud Ahmed Togan's knowledge of the english language was confined to some words.

5.2.5.2 Vocational background

Mr. Abdulkadir Jama Abas had a good background as a mechanic and machine operator which was very helpful for the progress of the training.
Mr. Mohamed Hussen Hassan had worked at FMW predominantly as a welder. Being somewhat younger than Mr. Abdulkadir Jama Abas his professional background was somewhat minor.
Mr. Mohamud Ahmed Togan as the youngest group member had some problems in the begin with tasks unknown to him before.

5.2.5.3 Willingness

All members showed diligence, interest and intellectual grasp to cope with the subjects mediated in the training.

5.2.6 Actual Training Programme

5.2.6.1 Actual Training period

The tentative scheme had to be departed from at the end of the first training month as only one of the mechanics, Mr. Adulkadir Jama Abas, has had sufficient knowledge of the English language to follow the lessons self-reliantly. If required to make permanent use of his services as an interpreter for his 2 colleagues and in consequence it necessitated to drop the idea of a much differentiating training for the electrician and the mechanics. Instead, a compromise

of group training had to be developed to meet the mechanic as well as the electric aspect.

Also, with the approval by UNIDO and the management of the Foundry & Mechanical Workshop, it was decided for the above problems of communication, to interchange the original periods of stay of 2 of the trainees.

The periods of stay were reset as follows:

Mr. Abdulkadir Jama Abas:	4 months
Mr. Mohamed Hussen Hassan:	3 months
Mr. Mohamud Ahmed Togan:	3 months

5.2.6.2 Revised Training Programme

The revised training programme is attached to this report in annexure 7B.

5.2.7 Individual Judgements on the Trainees and Proposals for their further Functions at FMW

An evaluation given already in the Interim Report is enclosed under annexure 7C to this report.

5.2.8 Certificates of Training

Certificates of Training were made out at the end of the respective training periods. Copies are attached to this report as annexure 7D.

5.2.9 Reporting

5.2.9.1 Progress Reports

Though not governed by the contract Fritz Werner delivered to UNIDO monthly Training Progress Reports.

5.2.9.2 Interim Report

A comprehensive Interim Report on the training was made out on 20/1/1984 and delivered to UNIDO.

5.3 Project Follow-up by Fritz Werner

Personnel in the Project Area

Regular trips to the project site, in order to inspect the progress of counterpart contribution, were made before the assignment of Fritz Werner's advisor as follows:

5.3.1 Journey by Mr. Sonntag 27/11 to 2/12/1983

Findings: no progress made

5.3.2 Journey by Mr. Anton 25/2 to 2/3/1984

This trip served the introduction of Mr. Bender, the technical advisor

Findings: The office rooms had been cleared, but no other progress could be seen.

5.4 Supplies and Services during the Assignment of the Advisor to the Project Area

5.4.1 Assignment Period of the Advisor

The original idea had been to send 2 different persons to the project area: a mechanic for the supervision of installation of newly supplied equipment to stay for 2 months, followed by a pump repair expert for a period of another 10 months. With the consent of UNIDO this intention was dropped in favour of delegating one person for the entire duration of the 12 months mission.

5.4.1.1 Arrival and scheduled stay of the advisor

Mr. Bender arrived at Mogadishu on 28/2/1984 scheduled to return to Germany on 28/2/1985.

5.4.1.2 Actual Period of Employment in the project area

Necessitated by governing circumstances the stay of Mr. Bender had to be extended twice:

- from March 1st to June 15th, 1985
- from June 16th to June 20th, 1985

5.4.2 Scheduled Activities of the Advisor in the Project Implementation

5.4.2.1 March 1st to April 30th, 1984

- Supervision of the installation of new equipment
- Supervision of repositioning and reconditioning of existing equipment

5.4.2.2 May 1st, 1984 to February 28th, 1985

- Technical assistance in pump repair
- Rendering of training (theoretical and practical) and know-how to FMW personnel
- Determination of spares, tools and accessories for the rehabilitation of existing machine pool
- Determination of specific pump spare parts to be stock ordered.

5.4.3 Scheduled main activities of Foundry and Mechanical Workshop

5.4.3.1 During period of installation of equipment

- Installation of glass bricks
- Repair of hall floor and roof
- Making of foundations and channels for machines newly supplied (according to drawings brought along by Mr. Bender)
- Installation of new equipment and re-arranged existing items
- Supply of and connection to the equipment of
  . electric power
  . water
  . compressed air
- Making of Test Stand Basin
- Erection of supervisor's/Shop office
- Store fencing
- Manufacture of other basins, working tables, shelves, bins (acc. to sub.-art. 4.3.2)

Some of the works as store fencing, manufacture of working tables and shelves, not disturbing the installation of equipment would have been permitted to overlap into the period of technical assistance.

5.4.3.2 During period of technical assistance

- Recruitment of additional personnel for the pump repair section
- Organisation of continuous outflow of pump in need of repair and outflow of repaired items
- Procurement of locally available materials for pump repair

5.4.4 Actual Activities of the Advisor

5.4.4.1 Services rendered in connection with installation

Mr. Bender's actual activities were not restricted to supervision of machine installation but comprised his physical engagement in:

- foundation and levelling works
- installation works (mechanical, electrical, hydraulical, civil constructional)
- repair of existing machinery, manufacture of spares

5.4.4.2 Services rendered in connection with his technical advisorship

5.4.4.2.1 Practical pump repair training

Practical training was confined to more or less dismantling, cleaning and re-assembly of

- submersible pumps
- centrifugal pumps

Training on piston pumps was improvised by using an out-of-order piston compressor. Other pumps were not available.

5.4.4.2.2 Project related practical training

It comprised

- mediation of general mechanics, blacksmith's, lockschmith's skills
- use of measuring tools
- reconditioning of cutting tools
- operation and adjusting of machine tools and appliances

- milling of gears
- preventive maintenance
- upkeeping
- rules of labour safety

5.4.4.2.3 Theoretical training

Aside general theoretical training, as technical drawing lessons and lessons on basical technical principles the training comprised specific lessons in pump theory:

- fields of pump application
- water where and how to be found
- accessibility of water
- which type of pump where and when to be used
- principles of geodetic suction height
- types of pumps and their mode of operation
- how to find underground water and how to convey it
- how to determine pump type and size to be used
- interdependence between pump lift height and output
- materials used for pumps
- sources of pump defects and trouble shooting

Respective skteches, charts and diagrammes were blackboarded by Mr. Bender to be taken down by his audience.

5.4.4.2.4 Side mission services appointed to

During his attachment to FMW Mr. Bender determined and requested for supply :

- spares, tools and appliances for rehabilitation and reactivation of existing equipment
- general spares and materials for pump repair purposes
- general workshop auxiliaries and materials

5.4.4.2.5 Services rendered outside of mission

Though ruled to be obligations of the Somalian counterpart, Mr. Bender invested - in the interest of project progress - a great deal of time into

- search for structural steel (manufacture of basins, shelves and working tables)
- search for and pick-up of repair-needy pumps

- clearing of project supplies through Somalian Customs
- search for pump documentation
- organisation of heavy duty transport equipment (truck crane) for the assembly of equipment

5.4.4.2.6 Services that could not be coped with

The following services intended could not be rendered by Mr. Bender:

- Determination and request of specific pump spare parts

  Reasons: During his entire assignment to the project only 11 pumps (submersible and centrifugal type) were delivered for repair, not allowing to be taken for a representative average. Of some pumps the nameplates had disappeared thus not allowing to identify make and model. Operating handbooks and spare parts lists were not traceable for any of the pumps

- Full service pump repair

  Reasons: part of the pumps were totally corroded and unrepairable and part of them had electrical defects, unrepairable with the existing and newly supplied equipment (motor reconditioning equipment being not part of the contract) - requirement of imported spareparts could not be identified - at site production of runners and impellers in the foundry failed for quality reasons - desposition welding equipment, newly supplied for deposition welding on worn pump shafts could not be used as welding acetylene could not be made available by the counterpart

- Commissioning of and Training on the pump test stand

  Reasons: Heavy delays in installation

- Training in the use of deposition welding equipment

  Reasons: No acetylene available

5.4.5 Further scheduled supplies of equipment and material out of the project funds after identification of requirement at site

5.4.5.1 First requirement

List of requirement made out by Mr. Bender with his progress

report for the months of March and April 1984. It contained hand tools, tools and accessories for existing machine tools, and an assortment of standard pump and general spares, as taper and parallel pins, Allen screws and circlips.

5.4.5.1.1 Tender evaluation was submitted to UNIDO 12/7/1984 and accepted by them through telex 1790 dated 31/7/1984.

5.4.5.1.2 Purchase orders were made out by Fritz Werner on 7th and 9th August 1984

5.4.5.1.3 Shipment was made in 2 packages on MS "SEAMASTER I" having sailed 22/10/1984, covered by Fritz Werner invoice No. 46010 dated 31/10/1984, total value DM 22.173,54 or US-$ 7.342,24

5.4.5.1.4 The consignment was cleared through customs and delivered to site begin of January, 1985

5.4.5.2 Second requirement

Second requirement, received from Mr. Bender end of June 1984, was for 10 pushbuttons as spares for existing machinery

5.4.5.2.1 Tendering was waived in accordance with art. 2 of contract amendment No. 1 and the items were ordered directly

5.4.5.2.2 Shipment was made in 1 package on 28/7/1984 by air freight, AWB No. 220-1704 8791, covered by Fritz Werner invoice No. 46008 dated 2/8/1984, total value DM 449,72 or US-$ 155,08

5.4.5.2.3 The consignment was cleared through customs end of August, 1984

5.4.5.3 Third requirement

Third requirement, received end of July, 1984, called for 4 spare parts (trip dogs) needed for the repair a guillotine shear of the steel structure Department

5.4.5.3.1 Permit was asked from UNIDO to have the parts manufactured at Messrs Loewe Pumpenfabrik on 26/7/1984 and okayed

by UNIDO telex ms 0120 dated 2/8/1984

5.4.5.3.2 Shipment was made in 1 package on 5/10/1984 by air freight, AWB No. 220-13573111, covered by Fritz Werner invoice No. 46009, dated 10/10/1984, total value DM 1.787,85 or US-$ 592,--

5.4.5.3.3 The consignment was cleared through customs and delivered to site mid of December, 1984

5.4.5.4 Fourth requirement

In his reports for the months of July, September and October 1984 Mr. Bender had required further electric and pneumatic hand tools, threading equipment, mechanics' tools, protective clothes, lifting appliances, spare motor, round and hexagonal bars from steel, stainless steel and bronce to make pump spares from them. The requirement dating from July could not be complied with immediately, as it needed further clarification with Mr. Bender during his stay in Germany in August for reporting.
Questions concerning steel and bronce bars had to be clarified with UNIDO in November 1984 first.

5.4.5.4.1 Tender evaluation was submitted to UNIDO on 20/12/1984 after a telex estimate had before been given to UNIDO by Fritz Werner telex No. 12/922 dated 20.12.1984.
UNIDO'S okay was telexed on 21/12/1984, ms 0991 (verbally ahead on 20/12/1984).

5.4.5.4.2 The goods were shipped in 2 consignments

- 9 packages containing spare motors, tools, lifting appliances and steel/stainless steel bars, by MS "HELGA WEHR" on 8/2/1985, covered by Fritz Werner invoice No. 46013, dated 22/2/1985 total value DM 22.661,98 or US-$ 6.764,77

- 2 bundles containing bronce round and hexagonal bars by MS "ANDALUSIA" on 20/3/1985, covered by Fritz Werner's invoice No. 46015 dated 27/3/1985, total value DM 5.936,36 or US-$ 1.946,35

5.4.5.4.3. The first consignment was cleared through customs and delivered to the Workshop in 2 parts between 5/5 and 6/6/1985.

5.4.5.4.4 The second consignment, having arrived end of April 1985, was not cleared through customs onto the end of Mr. Bender's mission.

5.4.5.5 Fifth requirement

In January, 1985, Mr. Bender required further electrical spare parts (switches, coolant pumps and plug-adapters) for existing equipment.

5.4.5.5.1 Tendering was waived in accordance with art. 2 of contract amendment No 1 and the items were ordered directly.

5.4.5.5.2 Shipment was made in 1 package on 7/3/1985 by airfreight, AWB-No. 220-26224796, covered by Fritz Werner invoice No. 46014 dated 8/3/1985, total value DM 1.159,22 or US-$ 380,07

5.4.5.5.3 The goods were customs cleared and delivered to FMW on 30/4/1985.

5.4.5.6 Sixth requirement

Request for fuses and car lifting jack was made in Mr. Bender's report for March 1985.

5.4.5.6.1 Tendering was waived in accordance with art. 2 of the contract amendment No. 1 and the parts were ordered directly.

5.4.5.6.2 Shipment was made in 1 package on 10/5/1985 by air freight, AWB No. 220-29367365, covered by Fritz Werner invoice No. 46016 dated 10/5/1985, total value DM 605,50 (US-$ equivalent cannot be given as invoice has not been paid by UNIDO by 30/7/1985).

5.4.5.6.3 The consignment was cleared through customs and delivered to site on 15/6/1985.

5.4.5.7 Final requirement

Upon his return from the project area Mr. Bender reported one Wattmeter of the Pump Test Stand and chemicals for water purification had to be renewed. The

replacement Wattmeter was delivered by Fritz Werner in November 1985 free of charge.
Chemicals have not been dealt with without knowledge when the test stand goes into operation. A prior dispatch of them would expose the chemicals to evaporisation anew.

5.4.6 Actual Counterpart Input of Supplies and Services

5.4.6.1 Works carried out

The counterpart fulfilled - under supervision of the advisor - his obligations pertaining to

- Installation of glass bricks
- Repair of hall floor and roof
- Laying of foundations and channels
- Erection of supervisor/shop office
- Mechanical installation of new and re-arranged equipment
- Feeding of electric power, compressed air and water to machinery and equipment
- Excavation of test stand basin, welding and concreting of test stand basin, welding of test stand superstructure
- Welding of cleaning and dip-paint basin
- Welding of working tables, racks and shelves, and necessary joinery work
- Erection of store fence
- Making available an office room for the advisor

By intervention of FMW management the pump test stand basin was not made as a double steel sheet shell construction, but as a single shell one. Also by intervention of the counterpart some of the racks/shelves were made of angular steel of lower cross section (30 x 30 mm instead of 50 x 50 mm)
All the works suffered from delay.

5.4.6.2 Materials supplied

The following materials, under their responsibility, were made available by FMW for the project

- Construction material: Sand, gravel, cement, perforated bricks
- Water pipes

- Electric cables to connect machinery and equipment
- Furniture for supervisor /shop office

5.4.6.3 Stipulated works not performed or performed only partially

- Restauration of sanitary installations (not)
- Organisation of pump onflow/outflow (not)
- Recruitment of additional personnel for pump repair section (partial)

5.4.6.4 Supplies that could not be made available from local sources

- Structural steels
- Materials for production of pump spares

5.4.6.5 Additional Services rendered by FMW, not obliged to

- Transport of the advisor until arrival of the project vehicle (28.2. to 21.4.1984)
- Initial procurement of petrol for project vehicle
- Transport and accomodation of Fritz Werner officials

5.4.7 Unscheduled Supplies of Materials out of the Project Funds

In their Progress Reports No. 5 dated 28/8/1984 (covering the period 1/7 to 8/8/1984), No. 6 dated 18/10/1984 (covering the period 20/8 to 30/9/1984), No. 7 dated 13/11/1984 (covering the period 1/10 to 31/10/1984), by their letter of 17/9/1984 and their telex No 10/70 dated 15.10.1984 Fritz Werner had informed UNIDO about the following tense situation:

A long-lasting search (having begun 20/3/1984 when Mr. Bender had handed over the requirement list to the Works Engineer, Mr. Mohamed Ali Ibrahim) for structural steels

- for the pump test stand basin
- for shelves and racks and working tables
- for cleaning and dip-paint basin
- for fencing of the store (mesh wire)

in the country had been ended unsuccessfully. As the Somalian counterpart could not fulfill his obligation of supply and as a further delay of project implementation could not be answered for, Fritz Werner proposed to UNIDO

to invest an amount of roughly US-$ 5.300,-- into the purchase of lacking structural steels.

UNIDO part agreed by telex dated 19/10/1984 ms 1352, but it needed further discussion in Vienna on 14/11/1984 to clarify. Final acceptance was given by UNIDO by telex ms 0913 dated 15/11/1984.

5.4.7.1 Evaluation of tenders was submitted to UNIDO by Fritz Werner letter dated 20/11/1984 and telex accepted by UNIDO on 29/11/1984 ms 1870.

5.4.7.2 Fritz Werner purchase order had been placed on 20/11/1984 already after receipt and evaluation of competative offers and verbal information of UNIDO.

5.4.7.3 Shipment in 13 packages was effected on 19/12/1984 by MS 'CAPE CORFU" covered by Fritz Werner invoice No. 46011 dated 4/1/1985, total value DM 14.125,55 or US-$ 4.216,58.

5.4.7.4 The consignment was cleared through customs and transfered to FMW on 24/2/1985

5.4.8 Supplies of Running Materials against Payment of Local Currency

The running material mentioned in sub-article 4.3.3.3 of this report was delivered to Foundry and Mechanical Workshop in 2 shipments

5.4.8.1 6 packages and 310 bags, shipped 30/4 and 3/5/1984 on MS "MARAKI", contents:
- 7 988 kg mild steel sheets R St 37-2, 2000 x 1000 x 2 mm
-26 250 ea welding electrodes 3,25 x 350 mm
- 15 tons foundry coke, grain size 120 to 200 mm, in used bags

5.4.8.2 7 packages, shipped 1/6/1984 on MS "REGINA S." contents:
-18 630 kg mild steel sheets RSt 37-2, 2000 x 1000 x 5 mm

5.4.8.3 Foundry and Mechanical Workshop made advance payment of the countervalue, Somali Shillings 319.162,-- to Fritz Werner's local account by direct transfer.

5.4.9 Actual Counterpart Manpower Input

5.4.9.1 Number of Workshop employees

5.4.9.1.1 State on 1/3/1984
10 heads + 1 practioner

5.4.9.1.2 State on 10/3/1984
2 persons having been arrested that day for theft among them Mr. Mohamed Ahmed Togan (trained in Germany), the personnel had shrunk to 8 workers + 1 practioner

5.4.9.1.3 State on 17/10/1984
2 lathe operators were engaged this day, bringing up the number of employees to 11

5.4.9.1.4 State on 15/1/1985
The number of employees has increased to 12

5.4.9.1.5 State on 28/3/1985
2 employees sacked on account of wage-cuts; number of remaining workers: 10

5.4.9.1.6 State on 1/5/1985 (lasting until 30/6/1985)
1 more employee has not shown up to work, thus reducing the number of heads to 9

5.4.9.2 Actual working hours

5.4.9.2.1 Nominal 42 weekly working hours as figuring in sub-article 4.2.3.10.1 of this report reduced in fact to 27 working hours the average of work begin lying at 7.30 hs, the average working day ending at 12.30 hs, interrupted by 1/2 hour of breakfast, thus reducing the nominal input rate to 65 %. Reasons of being late or going early must be blamed to the individual workers but to unreliability of public transport or shortage of fuels, too.

5.4.9.2.2 Idling in addition was caused by frequent power blackout or, temporary power shortage which in general cut away 20 to 30 percent of working readiness (average calculation 25 %).

5.4.9.2.3 The average monthly absence rate of the personnel amounted to 20 %.

5.4.9.2.4 Net output calculation:
0,65 x (5.4.9.2.1)x 0,75
(5.4.9.2.2) x 0,8 (5.4.9.2.3)= 0,39 (39 %)
output.

5.4.9.2.5 In other words:
- The maximum of 12 persons employed by the Mechanical Workshop created a monthly work-output of approx. 4.7 man-months
- Calculating the average number of 10 heads monthly the monthly net labour output of the Mechanical Workshop was equal to approx. 4 full man-months only.

5.4.9.3 Actual Availability of Workshop Personnel for the Pump Repair Project

About 1/3 of the personnel (machine tool operators) employed were engaged permanently with machining of standard production articles of FMW.
Reducing their activities from the toal net labour output figuring under sub-art. 5.4.9.2.5, the manpower input for the implementation of the pump repair section has to be set to max. 3 man-months of 42 working hours per week.

5.4.10 Actual Timetable of Project Realization in the Project Area

Tentative Period: 12 months
March 1st, 1984 to Feb. 28th, 1985
First Extension Period: 3,5 months
March 1st, 1985 to June 15th, 1985
Second Extension Period: 0,5 months
June 16th, 1985 to June 30th, 1985

5.4.10.1 Civil Construction Works

5.4.10.1.1	Installation of glass bricks	31.3.84 - 25.4.84
5.4.10.1.2	Mending of roof leaks	26.11.84
5.4.10.1.3	Upgrading of sanitary installations	--

5.4.10.1.4	Demolition of old machine foundations (existing machinery to be repositioned) and laying of new machine and crane foundations	18.8.84 - 9.10.1984
5.4.10.1.5	Laying of new hall floor (in 3 steps)	29.1.85 - 9.06.1985
5.4.10.1.6	Erection of Shop office	12.12.85 - 11.1.1985
5.4.10.1.7	Fencing of Storage area	12.06.85 - 20.6.1985

5.4.10.2 Installation of Media

5.4.10.2.1	Compressed airline	1.07.84 - 8.08.1984
5.4.10.2.2	Water Piping into hall	1.09.84 - 30.9.1984

5.4.10.3 Mechanical installation/ re-installation of machinery and equipment

- Milling machine (it. 15.3/15.4)
- Annealing furnace (it. 16.3)
- Forging fire (it. 16.4)
- Extractor fan (it. 13.5/2)
- Double wheel stand (it. 16.6)
- Belt grinder (it. 13.3)
- Bending and ram press (it. 13.4)
- Swage block (it. 16.1)
- Straightening plate (it. 16.2)
- Anoil (it. 16.5)
- Marking table (it. 15.1) 1.06.84 - 30.6.1984

- Hacksaw (it. 14.4)
- Band saw (it. 14.1)
- Tool grinder (it. 12.1)
- Compressor (it. 17.1)
- Extraction tubes for welding generator (it. 13.2) and forging fire (it. 16.4)
- Lathes (it. 11.1/11.2) 1.07.84 - 8.08.1984
- Shapers (it. 10.1/10.2)
- Column screw press (it. 8.4) 1.09.84 - 30.09.1984
- Swivelling cranes (it. 5.1/8.1) 1.10.84 - 31.10.1984

5.4.10.4 Electrical installation/ re-installation of machinery and equipment

- Double wheel stand (it. 16.6)
- Bending and ram press (it. 13.4) 1.09.84 - 30.09.1984
- Belt grinder (it. 13.3)
- Forging fire (it. 16.4)
- Annealing furnace (it. 16.3)
- Column drilling machine (it. 15.2)
- Shaper (it. 10.1)
- Milling machines (it. 15.3/15.4)
- Lathe (it. 11.1) 1.10.84 - 31.10.1984

- Swivelling cranes (it. 5.1/8.1)
- Injector blast cabinet (it. 5.4)
- Compressor (it. 17.1) 1.11.1984 - 30.11.1984
- Extractor fan (it. 13.5/2)
- Lathes (it.11.1/11.2)
- Shaper (it. 10.2)
- Hack Saw (it. 14.4) 13.12.1984 - 25.12.1984
- Tool grinder (it. 12.1) 14.05.1985

5.4.10.5 Installation of Pump Test Stand

5.4.10.5.1	Excavation of test stand basin Pit	8.09.1984 - 29.10.1984
5.4.10.5.2	Laying of pit foundation	29.10.1984 - 31.10.1984
5.4.10.5.3	Welding of sheet metal basin coat	29.10.1984 - 3.12.1984
5.4.10.5.4	Side concreting of test stand basin pit up to 30 cm below floor level	5.01.1985 - 8.01.1985
5.4.10.5.5	Assembly and fitting-in of test stand basin cover/superstructure	1.02.1985 - 19.05.1985
5.4.10.5.6	Final concreting of basin pit to floor level	7.05.1985
5.4.10.5.7	Mechanical Assembly of test stand controls	14.05.1985 - 19.05.1985
5.4.10.5.8	Electrical connection, installation of water and compressed air supply lines	20.05.1985 - 20.06.1985
5.4.10.6	Production of shelves, racks, working tables	1.12.1984 - 16.05.1985

5.4.10.7 On-flow of pumps in need of repair

- 4 Submersible pumps collected from Water Development Agency, Mogadishu . 29.10.1984
- 1 Highpressure centrifugal pump
- 1 Centrifugal pump collected from Johar Sugar Factory 2.12.1984
  (1 big size centrifugal pump found there could not be transported on the VW Kombi)
- 1 Submersible pump delivered from a private customer 28.05.1985
- 1 High pressure centrifugal pump delivered from same private customer 2.06.1985
- 4 Submersible pumps collected from Water Development Agency 4.06.1985

5.4.10.8 Training- on the job of FMW personnel

5.4.10.8.1 General mechanical skills, operation of machine tools, reconditioning of tools, use of measuring instruments, theory 1.03.1984 - 30.06.1985

5.4.10.8.2 Pump repair, pump technology 1.11.1984 - 30.06.1985

5.4.11 Further Project Follow-up by Fritz Werner personnel in the project area during the assignment of the advisor

Journeys to the site were made regularly

to control the work of Fritz Werner's advisor delegated, and to inspect the progress of counterpart's obligations:

5.4.11.1 Journey by Mr. Sonntag 30/8 to 5/9/1984

Finding the project under considerable delay, as already reported before by Mr. Bender, Mr. Sonntag made out Minutes of Meeting defining immediate actions to be taken by FMW. The Minutes of Meeting 3/9/84 countersigned by the Deputy General Manager of FMW are enclosed as annexure 5 B to this report.

In general the obligations imposed on FMW therein were coped with

5.4.11.2 Journey by Mr. Sonntag 23/11 to 2/12/1984

During this visit detailed Minutes of Meeting (enclosed as annexure 5 C to this report) were made out on 28/11/1984 and countersigned by the General Manager of FMW.
The deadlines set forth therein were not adhered to in every case.

5.4.11.3 Journey by Mr. Anton, Mr. Sonntag 14/1 to 21/1/1985

This visit was paid to the project area together with Mr. Fritz and Mr. Sonntag of UNIDO, Vienna. The results of UNIDO inspection visit have been written down in their Mission Report dated 25/1/1985 and its appendices (Minutes of Meeting dated 16/1/1985, Annexes A and B, Addenda I to IV).
The findings made necessitated the extension of Mr. Bender's stay until mid of June, 1985.

5.4.11.4 Journey by Mr. Sonntag 23/11 to 27/11/1985

This visit turned up some further repairneedy pumps to have been collected by FMW in the meantime. Part of the pumps had been repaired. During the mission another series of pictures of the project were taken by Mr. Sonntag.

6. MAIN PROBLEM AREAS

The Project suffered from heavy delays and one main objective, training of Somalian personnel in pump repair over a long period could not be attained.

Reasons of the delay must be seen in the following areas

6.1 Material Problems

6.1.1 Civil Construction Material

- There was no continuous supply of cement.
- Structural steels for the test stand, for the construction of storage appliances and fencing material were looked after for 5 months from March to August 1984 in Somalia but could not be found. They had to be ordered from Germany subsequently and were available at the site end of February, 1985, only.

6.1.2 Welding Gas

Acetylene for deposition welding was not available. Therefore a training on this equipment could not be rendered.

6.1.3 Energies

6.1.3.1 Petrols were scarce in Mogadishu in particular between June 1984 and April 1985, affecting public transport and the operation of the motorpool (including the forklift) of Foundry and Mechanical Workshop.

6.1.3.2 Frequent electric power shortage reduced the operational readiness of equipment for 25 % in average. In particular welding capacity was diminished during the period of test stand installation. Electric welding could not be substituted by autogenous welding due to unavailability of acetylene.

6.1.4 Lifting/Hoisting Equipment

Lifting/hoisting equipment other than a 4 ton Diesel engine driven fork lift were not available for the project. It has been out of order since January 1985.

6.1.5 Pump Spare Part Lists

Missing pump spare part lists frustrated their determination and stocking.

6.2 Personnel Problems

6.2.1 Workoutput

A rough estimate of work output has been made in sub-article 5.4.3.2 of this report. It must be calculated to reach only 30 % of a working week of nominal 42 hours

Reasons

- Average absence rate of 20 %
- Idling caused by electric power shortage
- Being late or going early caused by unreliability of public transport

6.2.2 Number of Persons available for the Project

The average number of 11 persons employed in the Workshop was definitely too short, considering

- the net output
- the fact that about 1/3 of the persons employed were occupied by machine work not for the project.

6.2.3 Qualification

Only 2 to 3 workers could be considered qualified, the rest having been more or less helpless.

6.2.4 Work discipline

A high content of work discipline and engagement was restricted to the qualified personnel.

6.2.5 Language Problems

The conversation between Mr. Bender and the Workshop personnel had to be mediated by the Workshop Engineer or the Foreman as most of the workers did not speak English sufficiently.

6.2.6 Fluctuation Rate

Form end of March to end of April, 1985, FMW lost 3 capable machine-tool operators, equalling 25 % of the total of Workshop employees. They stayed away from work after a "negative-incentive" wage system had been introduced by FMW management.

6.3 Organisatory Deficiencies

6.3.1 to the account of government

6.3.1.1 Pump Competence

At the end of the reporting period, still the competence over hydroeconomy was held by several ministries/agencies/ state corporations. Pump data were not available from them.

6.3.1.2 Bureaucracy

The average sacrifice of time for clearing the supplies through Somalian customs after arrival at the port/airport of Mogadishu was 6 weeks per consignment. The clearing procedure mostly required presence of Mr. Bender tying him for several days per event.

6.3.1.3 Communication System

6.3.1.3.1 Telephone calls to and from Mogadishu usually were cut after max. 1 minute.

6.3.1.3.2 The few telex lines that could be used during the project implementation (Cigarette Factory neighbouring Foundry and Mechanical Workshop, UNDP Res. Rep.) were mostly busy or interrupted so urgent messages often could not be transmitted or had to be conveyed on the costly cable way.

6.3.1.3.3 Airmailed letters in either direction to or from Mogadishu took in average between 1 and 3 weeks, in one case 6 weeks.

6.3.1.4 Petrol Supply Situation

The petrol situation was absolutely insufficient in the second 1984 half and begin of 1985. It required hour-long queueing at one of the few gas-stations of Mogadishu every few days for a ration of 15 litres. For the project car refueling the situation improved in October 1984 after personal intervention of Mr. Bender and Work Engineer at the Petrol Agency.

6.3.2 to the account of UN organisations

6.3.2.1 Bills of Lading/Shipping documents, sent through Fritz Werner via UNIDO Vienna to UNDP Res. Rep. Mogadishu were in some cases available for Mr. Bender only after the arrival of the respective ship at the port.
It brought another delay into the clearing procedure.

6.3.2.2 Mail sent via UN Pouch Service, Geneva took 4 weeks in average.

6.3.2.3 The attention UNDP Res. Rep. Mogadishu staff paid to the project appeared to be not very distinct. Only one short visit by the UN officer in charge of the project was made at the site during the entire period of Mr. Bender's assignment. Handing over of the project to FMW was not attended by them.
From May 1983 to June 1985 the UNDP Res. Rep. project manager was exchanged four times.

6.3.2.4 The time consuming tendering and approving system for supplies as ruled by the contract was an obstruction of the project. In effect, the time required from the request through Mr. Bender to the availability of the goods in the project area accumulated to 4 to 5 months.

6.3.3 to the account of
Foundry and Mechanical Workshop

6.3.3.1 Organisation of pump onflow

This task was not accomplished by FMW. Pump repair training therefore was incomplete.

6.3.3.2 Accessibility to Stocks

Cement though on stock was on several occasions not available for days as the storekeeper who held the store key had fallen ill and master keys were not existing. This situation already described in the Kienbaum study delayed the concreting of the pump test stand for days.

6.3.3.3 Civil Construction works

Civil construction works started with delay as necessary motions with the Ministry of Industry and the Ministry of Finances were made too late.

7. SUPPLIES OF NEW MACHINERY EQUIPMENT AND MATERIALS

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7. 1 Determined New Equipment for Pump Repair

SUB-ARTICLE 7. 1.1 First Shipment

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
Shipped on MS "TAGAMA" 29-12-1983 from Hamburg, packed in 3 one-way containers, gross weight 33.109 kg Fritz Werner Invoice No. 46.003 dated 30-12-1983			Supplies from Theisen-Werkzeuge			
	2	ea	ABUS Swivelling column crane, type VS capacity 1000 kg, sweep 3000 mm, swivelling range 360°, electrical chain hoist with 2 lifting speeds, power rating 0,8 kW	5.1 8.1	5 8	Diagnosis, Dismantling, Cleaning Pump Re-assembly
	1	ea	Ribbed straightening plate 1000 x 1000 mm with substructure	16.2	16	Smithy
	1	ea	Swage block 600 x 600 mm with base	16.1	16	Smithy
	1	ea	Marking table, 1000 x 800 mm with 4 adjustable supports	15.1	15	Tool Making Section
	1	ea	Forging fire 950 x 950 x 800 mm with chimney	16.4	16	Smithy
	1	ea	Heavy anvil 175 kg with base	16.5	16	Smithy
	1	ea	Hydraulically operated double arm extractor, max. opening 600 mm, with cylinder, hand pump, high pressure hose, 2 each extracting hooks 225 and 400 mm depth, and connections		5	Dismantling
	1	ea	Gasket ring cutter, capacity 80 to 1250 mm dia.			
	1	ea	Mobile lifting table type A 5, lifting capacity 500 kg, platform dimensions 650 x 1000 mm, min./max. lifting height 410/1010 mm	7.1	7	Motor repair

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7. 1 } continued

SUB-ARTICLE 7. 1.1 }

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
	1	set	of 9 ring/open end spanners for metric size hex screw heads 9 to 22 mm A/F.			Basic outfit of tools, fixtures, instruments and shop furniture for jobs and machines
	1	ea	Sledge hammer 5 kg with hickory handle			
	15	ea	Abrasive wheel 178 x 8 mm for electric angular grinder			
	15	ea	Abrasive cut-off wheel 178 x 3 mm for steel cutting			
	10	ea	Abrasive cut-off wheel 178 x 3 mm for rock cutting			
	1	set	of 3 blacksmith's tongs 400 mm length, Wolf's jaw, Round jaw, Flat jaw			
	1	set	of 2 anvil chisels (hot and cold clipping) with hickory handle			
	1	ea	Anvil horn insert			
	1	ea	Anvil horn chisel			
	2	ea	Die forged parallel vice, 150 mm jaw width			
	1	set	of 37 HSS spiral drills with taper shank, 14 to 32 mm dia, 0,5 mm stepped			

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.1

SUB-ARTICLE 7.1.1 continued

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
	1	set	of mechanical extractor assortment, comprising 2 outside extractors, 1 extractor chuck, 8 inside extractors and 2 counter-supports			
	8	ea	Workbenches, steel substructure with wooden plate, width 1500 mm, 3 drawers			
	8	ea	Parallel vice, die forged, jaw width 150 mm			
	3	set	of 10 each diverse grinding points, shank dia. 6 mm			
	2	ea	Tool trolleys			
	3	set	of 8 tungsten-carbide tipped rock drills			Basic outfit of tools, fixtures, instruments and shop furniture for jobs and machines
	2	set	Tool and instrument assortment (83 different parts) for electricians, contained in leather tool kit			
	7	set	Tool and instrument assortment (80 different parts) for mechanics			
	1	ea	Steel sheet tool kit, 5 parts, dimensions 530 x 200 x 200 mm			
	2	set	Tool and instrument assortment (72 different parts) for plumbers			
	2	ea	Steel sheet tool kit, 5 parts, dimensions 530 x 200 x 200 mm			

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.1 continued

SUB-ARTICLE 7.1.1

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
	8	set	of 25 spiral drills, straight shank, 1 to 13 mm dia, 0,5 mm stepped			
	1	set	Drive sockets for metric size hex screw heads 10 to 32 mm A/F, including reversible ratchet, T-handle, extension bars, universal joint, 26 parts contained in metal tool box			
	1	set	Drive sockets for Whitworth size hex screw heads 3/8 to 1 1/4" A/F, including reversible ratchet, T-handle, extension bars, universal joint, 25 parts contained in metal tool box			Basic outfit of tools, fixtures, instruments and workshop furniture for jobs and machines
	1	set	of 13 ring/open end spanners for Whitworth size hex screw heads 1/4 to 1"			
	1	set	of 10 Allen Keys 2 to 14 mm A/F, in plastic bag			
	1	set	of 11 Allen Keys 0.05 to 3/8" A/F, in plastic bag			
	2	ea	Self-gripping pipe tongs, max. grip width 2"			
	2	ea	Pipe-vice stands, max. pipe capacity 2"			
	3	set	of 3 each patent bar clamps max. opening 200 - 400 - 1000 mm			
	3	ea	Flat chisel 200 mm			
	3	ea	Cape chisel 200 mm			

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.1

SUB-ARTICLE 7.1.1 continued

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
	2	set	of 6 each screw extractors, in plastic box			
	1	ea	Slide caliper, measuring range 500 mm			
	1	ea	Depth gauge, measuring range 300 mm			
	2	ea	Precision dial indicator, measuring range 10 mm, readout 0,01 mm			
	1	ea	Magnetic dial indicator stand, max. clamping height 290 mm			Basic outfit of tools, fixtures, instruments and workshop furniture for jobs and machines
	1	pair	V-blocks (single notch) 100 x 40 mm			
	1	ea	Vernier height gauge, max. scribing height 250 mm with 1 spare carbide scriber			
	1	set	Tap and die assortment for internal and external metric threads M3 to M20, including die stocks, adjustable tap wrenches and screw pitch gauge, contained in metal box			
	1	set	of 6 single-ended open jaw spanners, 24 - 27 - 30 - 32 - 36 - 41 mm jaw opening			
	1	set	of 6 different circular steel wire brushes with shank			
	10	ea	Steel wire brushes, 4 rowed			

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7. 1

SUB-ARTICLE 7. 1.1 continued

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
	1	ea	Light type chain pipe wrench for pipe sizes 3/8 to 4", chain length 450 mm			
	1	ea	Feeler gauge 0.05 to 1.0 mm			
	8	ea	Lockable tool cabinet, made from steel sheet, width 920 mm, depth 480 mm, height 1000 mm, with 2 drawers and 2 shelf plates			
	1	ea	Roller wheel dresser 55 x 24 mm			
	8	ea	Hack saw frame			
	50	ea	Hand hack saw blades 300 x 13 x 0.65 mm, 24 teeth per inch			Basic outfit for tools, fixtures, instruments and workshop furniture for jobs and machines
	2	ea	Ratchet pipe thread cutter, threading range BSP 1 to 2"			
	2	ea	Die head with dies for BSP 1/2"			
	2	ea	Die head with dies for BSP 3/4"			

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7. 1 Determined New Equipment for Pump Repair

SUB-ARTICLE 7. 1.1 First Shipment

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
			Supplies from Dr. Max Theisen			
	1	ea	AGEO Hand operated 4 column screw press type SP 40/650, normal pressure 40 tons, spindle dia. 95 mm, ram travel 345 mm, ram bore 50 mm table dimensions 650 x 550 mm, including spare parts for 2 years' operation	8.4	8	Pump re-assembly
	1	ea	REMA Double grinding wheel stand model DS 30/400, for dry grinding, equipped with 2 grinding wheels 440 x 127 x 40 mm, including 6 spare grinding wheels, spiral drill grinding attachment and spare parts for 2 years' operation, power rating 2,2 kW	16.6	16	Smithy
	1	ea	GREIF Double belt sanding machine type D 20-2-2, belt length 1250 mm, belt width 30mm, including 30 spare sanding belts and spare parts for 2 years' operation, power rating 0,55 kW	13.3	13	Welding section
	1	ea	Wheeled welding transformer ESAB type THF 250 adjusting range 45 to 250 A, equipped with 5 m each hand and workpiece cable 35 mm^2, electrode holder, workpiece clamp, protecting shield, pick and wire brush, including 1755 welding electrodes for steel of various cross section and composition, and 2,5 kg electrodes for cast iron welding	13.2	13	Welding section

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.1

SUB-ARTICLE 7.1.1 continued

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
	1	ea	JOHNSON exhausting arm 2 m length, with exhausting fan F 1400 0,45 kW	13.2/5	13	Welding section
	1	set	Autogenous welding equipment, comprising 1 cart for the transport of 2 welding cylinders 40 ltr wheel dia 400 mm, solid-rubber tyred, 2 each acetylene and oxygen cylinders with Italian style connections, unfilled, equipped with reduction valves, non-return valves, 10 m each oxygen and acetylene hose, 1 complete set of welding and cutting tools, 1 kg silver solder, 50 kg welding wires, and 1 kg fluxing agent	13.5	13	Welding section
	1	set	Electric soldering equipment, comprising 1 each ERSA soldering gun 50 Watt and 200 Watt, 1 kg soldering wire, 5 kg soldering bars and soldering agents			Basic outfit of electric hand tools for general purpose
	1	ea	BOSCH electric two-speed hand drilling machine type 1126,drilling capacity 13 mm in mild steel, power rating 550 W			
	1	ea	BOSCH electric two-speed percussion hand drilling machine type 1182.7, drilling capacity 13 mm in mild steel, power rating 500 W			
	1	ea	BOSCH electric angle hand grinder type 1321.4, for abrasive/cut-off wheels 178 mm Ø, power rating 1,8 kW			

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.1 } continued

SUB-ARTICLE 7.1.1 }

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
	1	ea	PFERD Flexible shaft machine type RU 2/250 SI/4 ZG, for grinding points etc. 6 mm shank dia, electric drive 0,3 kW			Basic outfit of electric hand tools for general purpose
	1	ea	GENKO Column drilling machine type SB 32 8 spindle speeds 150 to 2100 r.p.m. through V-belt gear and pole-changing motor 1,2/1,5 kW, drilling capacity in mild steel 32 mm, spindle bore No. 3 M.T., quill travel 150 mm, throat depth 300 mm, table size 325 x 365 mm, machined baseplate 710 x 460 mm, equipped with quick-acting drill chuck 3 to 16 mm and mandrel reduction sleeve M.T. 3/2, machine vice 110 mm jaw width, including spares for 2 years' operation	15.2	15	Tool and Fixture Making Section
	1	ea	BOSCH Drilling and chipping hammer with electro-pneumatic impact mechanism, drilling capacity 8 to 35 mm in concrete, power rating 800 Watt, equipped with 6 chisels, drill holder and 15 impact drills of various diameters			Basic outfit of electric hand tools

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.1 Determined New Equipment for Pump Repair

SUB-ARTICLE 7.1.1 First Shipment

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
			Supplies from Heinrich Schlick			
	1	ea	SCHLICK Injector Blasting Cabinet type 151 for dry-cleaning and de-rusting of pump components by means of abrasives, working cabinet dimensions approx. 650 x 550 x 450 mm, electric power rating 0,37 kW, including 100 kg Corundum 45 mesh, 1 set of rubber gloves and spare parts for 2 years' operation	5.4	5	Diagnosis, Dismantling, Cleaning
			Supplies from STEINBOCK			
	3	ea	STEINBOCK Hand pallet trucks, type HU 2/54/112 Gu/Nyl, hydraulically operated, lifting height 120 mm, lifing capacity 2000 kg			Basic Means of Transportation

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.1 Determined New Equipment for Pump Repair

SUB-ARTICLE 7.1.1 First Shipment

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
			Supplies from Gebhard Industrievertretung			
	1	set	Compressed Air supply mains, comprising 132 m seamless steel pipe 1", 42 m dito 3/4", all necessary valves, tube clips, reduction sleeves, elbows, T-pieces and fastening material, sealing material, quick couplings and nozzles, 10 blow-out guns including flexible hoses and 3 maintenance kits		17	Compressed Air supply
			Supplies from Raab Karcher			
	2632	ea	Glass bricks, clear, 19 x 19 x 10 cm			Rehabilitation of Workshop building, machine foundations
	5	t	Portland cement quality PZ 350 DIN 1164, bagged			
			Supplies from Castolin GmbH			
	1	set	Casto Dyn System 2000 Equipment for micro powder coating and deposit welding, comprising torch, upper and lower protective screen, spray focus attachment, spraying nozzles, gas lighter, protective goggles, flow valve for compressed air, air control and filtering unit, flowrate and pressure measuring unit, connecting hoses, including 3 modules welding powders of various composition and 600 g calking putty		16	Welding Section

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7. 1 } continued

SUB-ARTICLE 7. 1.1 }

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
			Supplies from Loewe Pumpenfabrik			
	1	ea	POMONA 42 R selfpriming centrifugal pump, suction/discharge connections B.S.P. 4", capacity 60 to 130 m³/h, total head 26 to 14 m, with electric motor 11 kW			Stand -by pumps for immediate requirement in case of longer repairs, Training items
	2	ea	as above, without drive			
	1	ea	CENTRIMONA 150 - 400 centrifugal volute pump, non-selfpriming, suction/discharge connections DN 200/150, capacity 250 - 400 m³/h, total head 55 to 50 m, with electric motor 75 kW			
	2	ea	as above, without drive			
	2	ea	WASSERBORN 22 FC submersible pumps for wells 4", pipe connection B.S.P.2", capacity 5 to 10 m³/h, total head 115 to 80 m with electric motor 3,7kW, control equipment and 100 m cable each			
	1	ea	WASSERBORN 6 BC submersible pump cut-away model, for wells 4" with motor 0,25 kW			Pump repair training items

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.1 Determined New Equipment for Pump Repair

SUB-ARTICLE 7.1.2 Second Shipment

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
Shipped on MS "Altavia" 11-2-1984 from Hamburg, packed in 1 one-way container and 1 case Fritz Werner Invoice No. 46005 dated 16-2-1984			Supplies from BOGE GmbH			
	1	ea	BOGE Automatic one-step air compressor model SB 1400-25/750, air cooled, 2 cylinders V-construction free air delivery 63.6 m 3/h pressure vessel contents 750 l operating pressure 11 bar power rating 11 kW	17.1	17	Compressed air supply
			Supplies from Gebhard Industrievertretung			
	1	set	of standard parts and materials as first outfit of universal pump spares comprising			
	20	ea	Adapter Italian socket/VDE plug		2	Pump Spare Parts Store
	30	m	Seamless galvanized tube 1/2"			
	6	m	Precision steel DIN 671/6mm Ø			
	6	m	dto. 8mm Ø			
	12	m	dto. 10mm Ø			
	12	m	dto. 12mm Ø			
	6	m	dto. 14mm Ø			
	6	m	dto. 16mm Ø			
	6	m	dto. 18mm Ø			
	6	m	dto. 20mm Ø			
	6	m	dto. 22mm Ø			
	6	m	dto. 24mm Ø			
	2	m	Key steel DIN 6880 8x8 mm			

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7. 1 Determined New Equipment for Pump Repair

SUB-ARTICLE 7. 1.2 Second Shipment

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
	2	m	Key steel DIN 6880 10x8 mm			
	2	m	dto. 12x8 mm			
	2	m	dto. 14x9 mm			
	1	kg	Spring steel DIN 2076 1,0 mm			
	1	kg	dto. 1,5 mm			
	1	kg	dto. 2,0 mm			
	1	kg	dto. 2,5 mm			
	30	m	Angle steel 40x40x5 mm			
	100	ea	Hex nut DIN 934 M 6			
	100	ea	dto. M 8			
	100	ea	dto. M 8 stainl. steel			
	100	ea	dto. M 10			
	100	ea	dto. M 10 stainl. steel			
	100	ea	dto. M 12			
	100	ea	dto. M 12 stainl. steel			
	30	ea	dto. M 14			
	50	ea	dto. M 16			
	50	ea	dto. M 18			
	50	ea	dto. M 20			
	50	ea	dto. M 22			
	50	ea	dto. M 24			
	50	ea	Wood screws with slot 4 x 35			
	50	ea	dto. 4 x 40			
	50	ea	dto. 4 x 50			
	50	ea	dto. 5 x 50			
	50	ea	dto. 5 x 60			
	50	ea	dto. 5 x 70			
	50	ea	dto. 6 x 50			

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.1 Determined New Equipment for Pump Repair

SUB-ARTICLE 7.1.2 Second Shipment

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
	50	ea	Wood scr ews with slot 6 x 60			
	50	ea	dto. 6 x 70			
	150	ea	Dowel 5 mm			
	150	ea	dto. 6 mm			
	150	ea	dto. 8 mm			
	100	ea	Hex screw DIN 631/933 M 6 x 40			
	100	ea	dto. M 6 x 60			
	100	ea	dto. M 6 x 100			
	100	ea	dto. M 8 x 40			
	100	ea	dto. M 8 x 60			
	100	ea	dto. M 8 x 80			
	100	ea	dto. M10 x 40			
	100	ea	dto. M10 x 60			
	100	ea	dto. M10 x 100			
	100	ea	dto. DIN 931/933 M12 x 40			
	100	ea	dto. M12 x 60			
	100	ea	dto. DIN 631/933 M12 x 100			
	100	ea	Allen screw DIN 912 M 6 x 40			
	100	ea	dto. M 6 x 60			
	100	ea	dto. M 6 x 100			
	100	ea	dto. M 8 x 40			
	100	ea	dto. M 8 x 60			
	100	ea	dto. M 8 x 80			
	100	ea	dto. M10 x 40			
	100	ea	dto. M10 x 60			
	100	ea	dto. M10 x 100			
	100	ea	dto. M12 x 40			
	100	ea	dto. M12 x 60			
	100	ea	dto. M12 x 100			
	1	assort-ment	Adaptor sleeve DIN 1481 2-6 mm			

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS
ARTICLE 7. 1 Determined New Equipment for Pump Repair
SUB-ARTICLE 7. 1.2 Second Shipment

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
	1	assort-ment	Cotter pin DIN 94 1,6 - 6 mm			
	1	dto.	Spring DIN 6798 6 -24 mm			
	1	dto.	Serrated lock washer DIN 6798 6-2			
	1	dto.	Washer DIN 125 6 -24 mm			
	2	ea	Heating disc			
	5	ea	Tress of hemp			
	5	kg	Fermit sealing compound			
	1	coil	Emery linen K 80 40 mm wide 50 m long			
	100	ea	Sheets of emery linen K 80			
	100	ea	dto. K 100			
	4,05	kg	Vulcanizing material P 100 1 mm thick			
	10	kg	Roller bearing fat			
	2	kg	Silicon 704			
	40	l	Hydraulic fluid			
	40	l	Boring emulsion			
	40	l	Cutting oil			
	2,4	ml	Lubricating graphite			
	2	kg	Talcum			
	1	kg	Molycote			
	1,2	ml	Creeping oil			
	1	l	Rust remover			
	5	m	O-seal viton 5 2 mm Ø			
	5	m	dto. 5M 3 mm Ø			
	5	m	dto. 4 mm Ø			
	5	m	dto. 5 mm Ø			
	5	m	dto. 8 mm Ø			
	5	m	dto. 10 mm Ø			
	5	kg	Rubber tissue 3 mm thick 1,25 m²			
	6	kg	Klingerit asbestos seal 3 mm thick 1 m²			

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.1 Determined New Equipment for Pump Repair

SUB-ARTICLE 7.1.2 Second Shipment

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
	10	coil	Sealing tape Nylon			
	20	coil	Insulating tape			
	5	kg	Cord graphite/asbetos 8x8			
	5	kg	dto. 10x10			
	5	kg	dto. 12x12			
	26	kg	Syntetic resin RAL 6011 varnish brillant			
	6	l	Diluter for syntetic resin varnish			
	32	kg	Priming coat green			
	6	l	Diluter for priming coat			
	30	m	Angle steel 20x20x3			
			Supplies from Elektrotechn. Laboratorium Baumann			
	1	ea	High tension tester UH 28 P for testing the insulating strength of electric motors and appliances adjusting range 0 to 5000 V, including a warning lamp combination (green and red lamp) and 1 pair of high voltage testing guns up to 6000 V and 2 m each high voltage cable.		7	Motor repair
			Supplies from Findler & Sohn			
	1	ea	Insulation indicator JK 100/500 VW for measuring within appliances with a nominal voltage upto 500 V, generation of tension by means of a magneto generator. Measuring ranges: leakage resistance 0 to 100 M ohm resistance 0 to 500 K ohm tension 0 to 600 V including 2 cable sets and carrying case		7	Motor repair

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7. 1) continued

SUB-ARTICLE 7. 1.2)

Details of shipment / Invoice No.	Qty.	unit	Description	Layout Ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
			Supplies from Dr. Bürklin			
	1	ea	Multimeter type METRAVO MA 3 E battery operated measuring ranges: AC and DC voltage 100 m V to 1000 V AC and DC 10uA to 10 A resistance 1 Ohm to 10 Mohm noise level - 40 to + 62 dB cables included		7	Motor repair
			Supplies from Volkswagenwerk Wolfsburg by UNIDO Purchase Order Nr. 15-3-A1497 dd. 29-12-1983			
	1	ea	VW Kombi 2-3-3 type 253552 white colour, 60 HP, hemi-head 4 cylinder engine, gasoline operated, off-road tyres, reinforced shock absorber, enlarged engine cooler, differential lock, and other extras for use in hot and dusty surroundings and off-road conditions, also equipped with a spare part package.			Project Vehicle use in field repair and maintenance

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.1 Determined New Equipment for Pump Repair

SUB-ARTICLE 7.1.3 Third Shipment

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
Shipped on M.S "Mangan" 3-3-1984 from Hamburg, packed in 1 one-way container Fritz Werner Invoice No. 46007 dated 9-3-1984	1	ea	Supplies from Loewe Pumpenfabrik Pump Test Stand for Submerssible,centrifugal and piston pumps comprising: Basin (local content) basin dimensions length 3,5 m width 3,0 m depth 4,0 m liquid level height 3,5 m The test basin covers a performance of a test quantity of max 150 m^3/h during a test period of 15 min. Test basin cover: steel plate with profile reinforcement to take a max load of 4000 Kp/m^2 Waterpreparation system: Consisting of a filter unit for separation of dirt particles and a chemicals dosage system (to avoid alga formation). Test grouping of 2 different systems: A clamp-sink station for submersible pumps, sink depth approx. 3,5 m,and a station with 2 hydraulically operated articulated tables	9.1to9.4	9	Pump Testing Stand

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7. 1)
SUB-ARTICLE 7. 1.3) continued

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection Ref. No.	/ machine Determination
			to take centrifugal/piston pumps and their respective drive motors. Table size 600 x 800 mm, resp. 600 x 600 mm, head regulation 400 mm A swivelling column crane in the center of the basin, having a working radius of 2,5 m and a lifting capacity of 1000 kg. is serving the 2 test stations. The connection of the horizontal pumps of various sizes to the suction pipe ND 125 is created by means of measuring sections and compensating reduction pieces. Connection between pumps and test motors is effected by couplings to be made in accordance with the various pump shaft dias. Filling and pressurizing station to test water tightness by means of a hand piston pump. Quantity measuring system As a tank measuring system to a max. quantity of 150 m ^{3}/h, pneumatically operated and timer-equipped. Manometric and suction head measuring system by means of measuring sections. Readout on a pressure gauge battery of accura-cy class ± 0,6			

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.1 } continued
SUB-ARTICLE 7.1.3 }

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
			Electric testing system with respect to current and rating input by means of ammeters and wattmeters. The test stand is laid out for 5 different measuring ranges - o to 10 kW - 10 to 30 kW - 30 to 60 kW - 60 to 90 kW - 0 to 3 kW (single phase AC) Connected load For the test of horizontal pumps delivered to repair without drive, one each of the following pole changing electric motors have been supplied as part of the test stand - 90/75 kW 3000/1500 r.p.m. - 52/42 kW 3000/1500 r.p.m. - 21/165 kW 3000/1500 r.p.m. - 5,7/4,7 kW 3000/1500 r.p.m. - 1,8/1,4 kW 3000/1500 r.p.m. pump for water preparation unit 2,2 kW			

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.1)

SUB-ARTICLE 7.1.3) continued

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
	3	ea	WASSERBORN 12 HB submersible pumps for wells 6" pipe connection B.S.P. 3" capacity 20 to 35 m^3/h, total head 150 to 100 m with electric motor 15 kW, control equipment and 120 m cable each			Stand-by pumps for immediate requirement in case of longer repair, Training items

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS
ARTICLE 7.2 Further scheduled supplies of equipment out of the project funds
SUB-ARTICLE 7.2.1 First requirement

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
Shipped on MS "Seamaster I" 22-10-1984 from Hamburg, packed in 2 packages, gross weight 804 kg Fritz Werner Invoice No. 46010 dated 31-10-1984			Supplies from Theisen Werkzeuge			)
	1	ea	Cable drum with 50 m rubber sheathed cable 3 x 1,5 mm²			)
	1	set	of 7 internal circlip pliers with straight jaws, size J0 to J6			)
	1	set	of 6 internal circlip pliers with cranked jaws, sizes J 01 to J 51			)
	1	set	of 7 external circlip pliers with straight jaws, sizes A 0 to A 6			)Basic outfit)of tools, fixtures)and instruments)for jobs and)machines
	1	set	of 6 external circlips pliers with cranked jaws, sizes A 01 to A 51			)
	10	set	of 5 ea. flat files, cut No. 1 150 - 200 - 250 - 300 - 400 mm			)
	10	set	of 5 ea flat files, cut No. 2, 150 - 200 - 250 - 300 - 400 mm			)
	10	set	of 4 ea flat files, cut No. 3 150 - 200 - 250 - 300 mm			)

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7. 2)
SUB-ARTICLE 7. 2.1) continued

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
	10	set	of 4 ea Half-round files, cut No. 1, 150 - 200 - 250 - 350 mm			)
	10	set	of 4 ea Half-round files, cut No. 2, 150 - 200 - 250 - 350 mm			)
	10	set	of 4 ea Half-round files, cut No. 3, 150 - 200 - 250 - 350 mm			)
	10	set	of 3 ea Triangular files, cut No. 1, 100 - 200 - 300 mm			)Basic outfit)of tools, fixtures)and instruments)for jobs and)machines
	10	set	of 3 ea Triangular files, cut No. 2, 100 - 200 - 300 mm			)
	10	set	of 3 ea Triangular files, cut No. 3, 100 - 200 - 300 mm			)
	10	set	of 3 ea Square files, cut No. 1 100 - 200 - 300 mm			)
	10	set	of 3 ea Square files, cut No. 2 100 - 200 - 300 mm			)
	10	set	of 3 ea Square files, cut No. 3 100 - 200 - 300 mm			)
	10	set	of 3 ea Round files, cut No. 1 150 - 250 - 350 mm			)
	10	set	of 3 ea Round files, cut No. 2 150 - 250 - 350 mm			)

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.2 } continued

SUB-ARTICLE 7.2.1 }

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
	10	set	of 4 ea Round files, cut No. 3 150 - 250 - 300 - 350 mm			)
	150	set	of 2 ea Ironwood file handles 100 - 120 mm			)
	120	ea	Ironwood file handles 140 mm			)
	30	ea	Ironwood file handles 160 mm			)
	3	sets	of 6 ea Warding files with handles, packed in plastic case			)
	10	sets	of 15 ea Square section tool bits, HSS with 10 % cobalt 6 x 100 mm, 8 x 100 mm, 8 x 160 mm, 10 x 80 mm, 10 x 160 mm, 12 x 80 mm, 12 x 125 mm, 12 x 200 mm, 14 x 100 mm, 14 x 160 mm, 14 x 200 mm, 16 x 100 mm, 16 x 200 mm, 20 x 200 mm, 25 x 200 mm,			) Basic outfit) of tools, fixtures) and instruments) for jobs and) machines
	2	ea	Edge finders, with recessed contact mandrel 10/4 mm dia.			)
	2	sets	of 2 ea recoilless Plastic face hammers with hichory handle, head dias 40 and 60 mm			)
	5	sets	of 2 ea spare tips 40 and 60 mm dia.			)
	10	set	of 6 ea Centering drills right-hand, dias 2 - 2,5 - 3,15 - 4 - 5 - 6,3 mm			)
	1	ea	Rotary precision machine vice, jaw width 160 mm max. opening 145 mm			)
	1	ea	Hardened prism jaw for above vice			)

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.2 } continued
SUB-ARTICLE 7.2.1 }

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
	20	ea	T-slot nuts 22 mm			)
	20	ea	idem 24 mm			)
	1	set	of 20 parallels 2 to 24 mm height, stepped by 1 mm, in wooden box			)
	1	ea	Rotary table 400 mm dia. with indexing mechanism 360° and indirect indexing			)
	5	ea	Live lathe centre No 4 M.T.			)
	2	ea	idem No. 5 M. T.			)
	1	ea	Live lathe centre No. 4 M.T., with extended point			)
	1	ea	idem No. 5 M.T.			)
	2	ea	T-handle key spanners 10 mm square A/F			) Basic outfit of tools, fixtures and instruments for jobs and machines
	2	ea	idem 14 mm			)
	8	ea	idem 12 mm			)
	2	ea	T-handle square socket spanners, opening 17 mm			)
	1	ea	Three-jaw drill chuck with gear rim and key, capacity 1 to 10 mm, inside taper B 12			)
	1	ea	idem, capacity 5 to 20 mm, inside taper B 22			)
	1	ea	Adapter arbor B 12/MT 2			)
	1	ea	idem B 22/MT 5			)
	1	set	of 9 Taper sleeves, one each MT3/2 - 3/1 - 4/3 - 4/2 - 4/1 - 5/4 - 5/3 - 5/2 - 5/1			)

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7. 2)

SUB-ARTICLE 7. 2.1) continued

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
	1	set	of 14 end milling cutters, 4 flutes, 3 to 20 mm in metal box			)
	1	set	of 14 end milling cutters, 3 flutes, 3 to 20 mm in metal box			)
	2	ea	straight carbide tipped turning tool 25 x 25 x 200 mm, right-cut			)
	2	ea	idem, left-cut			)
	2	ea	Bent square-nosed carbide tipped turning tool 32 x 20 x 250 mm, right-cut			)
	2	ea	idem, left-cut			)
	2	ea	HSS inside turning tools 10 mm dia x 160 mm			) Basic outfit of tools, fixtures and instruments for jobs and machines
	2	ea	idem 16 mm dia x 220 mm			)
	2	ea	Carbide tipped inside turning tool 25 mm dia x 315 mm			)
	2	ea	HSS inside corner turning tools 10 mm dia x 160 mm			)
	2	ea	idem 16 mm Ø x 220 mm			)
	2	ea	Carbide tipped inside corner turning tools 25 mm dia x 315 mm			)
	2	ea	HSS grooving tool 16 x 10 x 125 mm cut width 3 mm			)
	2	ea	idem 20 x 12 x 140 mm, cut width 4 mm			)
	2	ea	idem 25 x 16 x 180 mm, cut width 5 mm			)
	2	ea	HSS hook recessing tools 10 mm dia x 160 mm, cut width 3 mm			)

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.2)

SUB-ARTICLE 7.2.1) continued

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
	2	ea	idem 16 mm dia x 220 mm, cut width 4 mm			)
	2	ea	Carbide tipped hook recessing tools 25 mm Ø x 315 mm, cut width 6 mm			)
	3	set	of 3 ea holders for round shank turning tools 10 - 16 and 25 mm			) Basic outfit of tools, fixtures and instruments for jobs and machines
	2	ea	Rubber coated hand lamps 60 W with 10 m cable			)
	1	ea	Marking stencil for letters A to Z letter height 6 cm			)
	1	ea	Marking stencil for numbers letter height 6 cm			)
	50	m	Cutting saw bands for wood working width 12 mm, thickness 1,2 mm, 4 teeth/inch			)

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7. 2)

SUB-ARTICLE 7. 2.1) continued

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
			Supplies from Fatscher Schrauben GmbH		2	Pump Spare Parts Store
			Standard pump spare parts comprising:			
	50	set	Taper pins DIN 1 1 x 10 - 1 x 18 - 1,5 x 10 - 1,5 x 18 - 1,5 x 26 - 4 x 16 - 4 x 28 - 4 x 60 - 5 x 24 - 5 x 36 - 5 x 70			
	100	set	idem 2 x 12 - 2 x 22 - 2 x 32 - 3 x 14 - 3 x 26 - 3 x 25			
	25	set	6 x 24 - 6 x 40 - 6 x 100 - 8 x 28 - 8 x 50 - 8 x 80 - 8 x 120			
	50	set	Straight pin DIN 7 1 x 4 - 1 x 6 - 1 x 12 - 1,2 x 4 - 1,2 x 8 - 1,2 x 14 - 1,5 x 4 - 1,5 x 8 - 1,5 x 12 - 1,5 x 16 - 2 x 4 - 2 x 8 - 2 x 12 - 2 x 16 - 2 x 2 0			
	100	set	idem 2,5 x 4 - 2,5 x 8 - 2,5 x 12 - 2,5 x 18 - 2,5 x 24 - 3 x 4 - 3 x 8 - 3 x 12 - 3 x 28 - 3 x 40 - 4 x 6 - 4 x 10 - 4 x 18 - 4 x 32 - 4 x 40 - 5 x 6 - 5 x 12 - 5 x 20 - 5 x 32			

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.2)

SUB-ARTICLE 7.2.1) continued

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
			5 x 40 - 5 x 50			Pump Spare Parts Store
	25	set	idem 6 x 6 - 6 x 12 - 6 x 20 - 6 x 36 - 6 x 50 6 x 60 - 8 x 8 - 8 x 16 - 8 x 24 - 8 x 40 - 8 x50 - 10x12 - 10 x 20 - 10 x 32 - 10 x 45 - 10 x 60 - 10 x 80 - 10 x 100 - 12 x 20 - 12 x 32 - 12 x 45 - 12 x 60 - 12 x 80 - 12 x 100 - 12 x 120			
	50	set	Hexagon socket countersunk head screws DIN 7991, 8G M 3 x 10/20/30 M 8 x 20/30/40/50 M10 x 20/30/40/50/70			
	100	set	idem M 4 x 16/25/40 M 5 x 20/30/40/50 M 6 x 20/30/40/50			
	50	set	Circlips for shafts DIN 471 10/12/15/18 x 1 18/20/22/25 x 1,2 30/32/35 x 1,5 40/45/48 x 1,75			

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.2)
SUB-ARTICLE 7.2.1) continued

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
	25	set	idem 50/55/60 x 2 62/70/72/80 x 2,5		2	Pump Spare Parts Store
	50	set	Circlip for bores DIN 472 10/12/15/17/20 x 1 25/30/32 x 1,2 35 x 1,5 40/42/45/47 x 1,75 50/55/60/62 x 2 65/68/ 72/ 75/ 80 x 2,5			
	25	set	idem 85/90/100 x 3 105/110/115/125/130/140/145/150/160/170 x 4			

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.2 Further Scheduled Supplies of equipment out of the project funds

SUB-ARTICLE 7.2.2 Second requirement

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
Shipped by airfreight 28-7-1984, AWB No. 220-1704 8791, packed in 1 package, gross weight 4 kg, Fritz Werner Invoice No. 46.008 dated 2-8-1984	10	ea.	Two-way push button switches K 2 - 22/i	--	--	Electrical repair of existing machine pool

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.2 Further Scheduled Supplies of equipment out of the project funds

SUB-ARTICLE 7.2.3 Third requirement

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection Ref. No.	/ machine Determination
Shipped by airfreight 5-10-1984, AWB No. 220-1857 3111, packed in 1 package, gross weight 3 kg, Fritz Werner Invoice No. 46.009 dated 10-10-1984	4	ea.	Trip dogs for guillotine shear of the steel structure section	--	--	Machanical repair of existing machine pool

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.2 Further Scheduled Supplies of equipment out of the project funds

SUB-ARTICLE 7.2.4 Fourth requirement

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
First partial shipment			Supplies from SIEMENS			
Shipped on MS "Helga Wehr" 8-2-1985 from Hamburg, packed in 9 cases, gross weight 2.693 kg,	2	ea.	3-phase A.C. squirrel-cage induction motors, foot-type type 1 LA 5090-4AA20, 1,1 kW, 380/220 V, 50 cycles, 1500 r.p.m.	--	--	Electrical repair of existing machine pool
Fritz Werner Invoice No. 46.013 dated 22-2-1985			Supplies from FERROCOMMERZ			
			Round steel bars St 37-2 DIN 1013 - approx. 12 linear meters of every dimension -	--	2	Production of pump spares - spare parts store -
	68	kg	30 mm dia.			
	100	kg	36 mm dia.			
	122	kg	40 mm dia.			
	154	kg	45 mm dia.			
	184	kg	50 mm dia.			
			Round steel bars ST 60-2 DIN 1013 - approx. 12 linear meters of every dimension -			
	67	kg	30 mm dia.			
	98	kg	36 mm dia.			
	120	kg	40 mm dia.			
	153	kg	45 mm dia.			
	180	kg	50 mm dia.			

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7. 2

SUB-ARTICLE 7. 2.4 contd.

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
			Round stainless steel bars X 20 Cr 13 (1.4021) DIN 1013 - approx. 6 linear meters of every dimension -	--	2	Production of pump spares - spare parts store -
	42	kg	30 mm dia.			
	60	kg	40 mm dia.			
	93	kg	50 mm dia.			
			Hexagonal steel bars DIN 176 - approx. 12 linear meters of every dimension -			
	26	kg	17 mm A/F quality C22			
	30	kg	19 mm A/F quality C22			
	42	kg	22 mm A/F quality C22			
	51	kg	24 mm A/F quality C22			
	62	kg	27 mm A/F quality C45			
	86	kg	32 mm A/F quality C45			
			Hexagonal stainless steel bars DIN 176 x 12 CrMoS17 - approx. 6 linear meters of every dimension -			
	12	kg	17 mm A/F			
	14	kg	19 mm A/F			
	20	kg	22 mm A/F			
	23	kg	24 mm A/F			

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.2

SUB-ARTICLE 7.2.4 contd.

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
			Supplies from THEISSEN WERKZEUGE			
	1	ea.	Arbor press, max. pressure 2 tons ram dia. 40 mm throat depth 145 mm			
	8	ea.	Tire levers 400 mm			
	8	ea.	idem, 600 mm			
	1	set	of 9 hexagon drive sockets for pneumatic impact wrench 10 - 13 - 14 - 15 - 17 - 19 - 21 - 22 - 27mm A/F			
	1	ea.	impact extension 130 mm			
	10	ea.	Nylon protective goggles			
	50	ea.	Abrasive cut-off wheels 178 x 3 mm, for steel cutting			
	1	ea.	Chain pipe wrench for pipe sizes 3/4 to 4", chain length 528 mm			
	1	ea.	idem, for pipe sizes 1 to 6", chain length 765 mm			
	1	set	of precision inside micrometer and extensions, measuring range 50 to 150 mm, reading precision 0,01 mm, contained in a plastic box			

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7. 2 }
SUB-ARTICLE 7. 2.4 } contd.

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
	1	set	of 6 precision outside micrometers, measuring range 0 to 150 mm, reading precision 0,01 mm, including 5 standard gauges, contained in a wooden box			
	1	ea.	Bevelled-edge steel square, hardened stainless steel, 100 x 70 mm			
	1	ea.	Knife-edged straight edge, stainless steel, length 125 mm			
	1	ea.	Flat steel square without stop, 150 x 100 mm			
	1	ea.	Flat steel square with stop, 150 x 100 mm			
	1	ea.	Protractor with 0° to 180° scale and lock joint arc dia. 120 mm, free blade end length 150 mm			
	1	ea.	Divider with quadrant, length 200 mm			
	1	ea.	Carbide hand scriber			
	1	ea.	Thickness gauge 0,05 to 1,0 mm, 20 blades 100 mm long			
	1	ea.	Screw pitch gauge for metric thread pitches 0,25 to 6 mm and Whitworth pitches 4 to 62 T.P.I.			

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7. 2
SUB-ARTICLE 7. 2.4 } contd.

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
	1	ea.	Precision spirit level, highly sensitive 1 division = 0,1 mm/m length 160 mm			
	1	ea.	Hand tachometer 40 to 50000 r.p.m.			
	1	ea.	Inspection mirror 23 mm ø			
	1	set	of 5 blind-hole magnets 1,6 to 11 mm dia.			
	1	ea.	Precision dial indicator, measuring range 30 mm, reading precision 0,01 mm			
	1	ea.	Hydraulic dial indicator stand, max. radius of action 260 mm			
	1	set	Tap and die assortment for internal and external metric threads M 3 to M 20, including die stocks, adjustable tap wrenches and screw pitch gauge, contained in metal box.			
	1	set	of 9 HSS dies for Whitworth threads 1/8 to 3/4"			
	1	ea.	Three-jaw drill chuck with gear rim and key, capacity 0,8 to 10 mm			
	1	ea.	Spare key for drill chuck			

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7. 2

SUB-ARTICLE 7. 2.4 contd.

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
			Supplies from DR. THEISSEN			
	1	ea.	REMS mobile electric threading machine type Tornado 2000, max. threading capacity 52 mm, motor power 1,4 kW, 220 V, equipped with automatic universal die head			
	1	set	of 4 threading dies for pipe threads B.S.P. 1/16" to 2"			
	1	set	of 9 threading dies for Whitworth threads 1/4" to 1" (20 to 8 T.P.I.)			
	1	set	of 12 threading dies for metric threads DIN 13, M 6 to M 30			
	10	pair	Protective gloves			
	10	pair	Protective gloves for sand blasting			
	1	ea.	Compressed air operated impact wrench type 2787, working range M 6 to M 16, air consumption 300 l/min			
	1	ea.	Bosch electric angle hand grinder type 1321.4, for abrasive cut-off wheels 178 mm dia., power rating 1,8 kW			

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.2

SUB-ARTICLE 7.2.4 contd.

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
			Supplies from KAISER + KRAFT	--	--	Lifting and transport of heavy components
	4	ea.	Hoisting and lifting belts, length 2 m, capacity 1250/2500 kp			
	4	ea.	Steel wire slings, length 3 m, capacity 1400 kp			
	2	ea.	Steelwire hoisting gear, with 2 wire ends 1 m and safety hooks capacity 1000/1400 kp			

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.2

SUB-ARTICLE 7.2.4 contd.

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
Second partial shipment			Supplies from FERROCOMMERZ			
Shipped on MS "ANDALUSIA" 20-3-1985 from Hamburg, packed in 2 bundles, gross weight 297 kg,			Round bronce bars DIN 1756 material 2.1020 - approx. 6 linear meters per dimension -			
	37,2	kg	30 mm dia.			
	61,4	kg	40 mm dia.			
	118	kg	50 mm dia.			
Fritz Werner Invoice No. 46.015 dated 27-3-1985			Hexagonal bronce bars DIN 1763, material 2.1020 - approx. 6 linear meters per dimension -			
	13,4	kg	17 mm A/F			
	17,2	kg	19 mm A/F			
	20	kg	22 mm A/F			
	30,2	kg	24 mm A/F			

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.2 Further Scheduled Supplies of equipment out of the project funds

SUB-ARTICLE 7.2.5 Fifth requirement

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
Shipped by airfreight 7-3-1985, ABW No. 220-2622 4796, packed in 1 package, gross weight 13,5 kg,	1	ea.	Snap switch P 1 - 32/i	--	--	Repair of existing machine pool
	3	ea.	Built-in automatic breaker 25 A			
	2	ea.	Snap switch Ti - 2/1			
	2	ea.	Coolant pumps with electric motor			
Fritz Werner Invoice No. 46.014 dated 8-3-1985	10	ea.	Euro plugs (adapter Italian socket: VDE plug)			

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.2 Further Scheduled Supplies of equipment out of the project funds

SUB-ARTICLE 7.2.6 Sixth requirement

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
Shipped by airfreight 6-5-1985, AWB No. 220-2936 7365, packed in 1 package, gross weight 13 kg,	25	ea.	Slow blowing fuse 6A incl. fuse holder and adapter	--	--	) General) electrical) maintenance)
	25	ea.	idem, 10A			
	25	ea.	idem, 16A			
	25	ea.	idem, 25A			
Fritz Werner Invoice No. 46.016 dated 10-5-1985	1	ea.	Lifting jack	--	--	Project vehicle

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.3 Unscheduled Supplies of Materials out of the project funds

SUB-ARTICLE

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
Shipped on MS "CAPE CORFU" 19-12-1984 from Hamburg, packed in 13 packages, gross weight 7.953 kg,			Supplies from FERROCOMMERZ			
	50	m	Steel wire netting, 2 m high, double galvanized, wire gauge 2,5 mm, mesh aperture 50 mm	--	1, 2, 3	Fencing of Shop Office and Stores
Fritz Werner Invoice No. 46.011 dated 4-1-1985	496	kg	Wide-flanged double T steel girder IPB 120 DIN 1025/Bl. 2 St 37, length 6 m	--	9.2	) Test Stand) Basin)
	207	kg	Narrow-flanged I steel girder I-120 DIN 1025/Bl. 1, St 37, length 6 m	--	9.2	)
	60	m	Threaded steel pipe 1" DIN 2440, including sockets	--	9	Water connection to Test Stand
	389	kg	Angle steel bar DIN 1028 St 37, 120 x 120 x 12 mm, length 18 linear m	--	2, 3, 5, 6, 9	Production of Shop Furniture and Basins
	180	kg	idem 30 x 30 x 3 mm, length 132 linear m	--	) 2, 3, 5,	
	5	kg	Square steel bar DIN 1014 St 37, 10 mm A/F, length 6 m	--	) 6, 9	Production of Shop Furniture
	864	kg	Flat steel bar DIN 1017, St 37, 100 x 10 mm, length approx. 108 linear m	--	) 2, 3, 5,	Production of Shop Furniture and Basins
	104	kg	idem 20 x 6 mm, length approx. 108 linear m	--	) 6, 9)	

CHAPTER 7 SUPPLIES OF NEW MACHINERY, EQUIPMENT AND MATERIALS

ARTICLE 7.3

SUB-ARTICLE

contd.

Details of shipment / Invoice No.	Qty.	unit	Description	Layout ref. No.	Adjoinment to pump repair subsection / machine Ref. No.	Determination
	3200	kg	Hot rolled steel sheet plates St 37 1000 x 2000 x 10 mm (20 plates)	--	5, 6, 9	Production of Shop Furniture and Basins
	672	kg	idem 1000 x 2000 x 6 mm (7 plates)	--		
	1392	kg	idem 1000 x 2000 x 3 mm (29 plates)	--		
Handed over 24-11-1984	2	ea.	Side-mirrors (left and right)	--	--	Project vehicle

8. PROJECT EXPENDITURE

8.1 Services

8.1.1 Service Contract Price

8.1.1.1	Original amount as per contract No. 83/23, Project No. US/SOM/80/083 signed 21/5 - 23/6/1983	US-$	196.970,--
8.1.1.2	Increase as per amendment No. 2 to the contract, signed 3/ - 9/7/1985		
8.1.1.2.1	Extension of advisor's stay from 1/3 to 15/6/1985	US-$	26.430,--
8.1.1.2.2	Extension of advisor's stay from 16/6 to 30/6/1985	US-$	4.000,--
8.1.1.3	Total revised amount for Services	US-$	227.400,--

8.1.2 Services invoiced by Fritz Werner

8.1.2.1	No. 46.000 dated 8/4/1983, 1st instalment, advance payment due after acceptance of contract award	US-$	90.000,--
8.1.2.2	No. 46.004 dated 30/1/1984, 4th instalment, due upon UNIDO's receipt of Fritz Werner's Interim report	US-$	40.000,--
8.1.2.3	No. 46.006 dated 29/2/1984, subsistance due upon arrival of the advisor in the project area	US-$	18.470,--
8.1.2.4	No. 46.012 dated 25/1/1985, 6th instalment for extension of advisor's stay from 1/3 to 15/6/1985	US-$	26.430,--

8.1.2.5	No. 46.017 dated 23/6/1985, 7th instalment for extension of advisor's stay from 16/6 to 30/6/1985	US-$ 4.000,--
8.1.2.6	No. 46.018 dated 27/9/1985, 8th instalment for Werner's Draft Final Report	US-$ 24.000,--
8.1.2.7	Total amount of services invoiced by Fritz Werner	US-$ 202.900,--
8.1.3	Unspent balance of services still to be invoiced by Fritz Werner which are due upon UNIDO'S acceptance of Fritz Werner's Final Report	US-$ 24.500,--
8.1.4	Invoices unpaid All invoices under 8.1.2 were paid on 31/1/1986	
8.2	Supplies	
8.2.1	Ceiling Price for Supplies	
8.2.1.1	Original amount available for supplies by Fritz Werner under Contract No. US/SOM/80/083	US-$ 242.500,--
8.2.1.2	Reduction for project vehicle bought through UNIDO directly, as per Statement of account enclosed to letter RT/sb dated 9/5/1984	US-$ 7.754,56

8.2.1.3	Reduction in exchange with service price increase as per amendment No. 2 to the contract		
8.2.1.3.1	Extension of advisor's stay from 1/3 to 15/6/1985	US-$	26.430,--
8.2.1.3.2	Extension of advisor's stay from 16/6 to 30/6/1985	US-$	4.000,--
8.2.1.4	Total revised ceiling amount for supplies	US-$	204.315,44
8.2.2	Invoices served by Fritz Werner for Project Purchases made		
8.2.2.1	No. 46.001 dated 10/11/1983, 2nd instalment, 45 % down-payment for equipment ordered (order value DM 405.877,89)= DM 182.645,05 paid at exchange rate 1 $ = 2,70 DM	US-$	67.646,31
8.2.2.2	No. 46.002 dated 24/11/1983, 3rd instalment, 45 % down-payment for equipment ordered in a value of DM 43.908,60 = DM 19.758,87 paid at exchange rate 1 $ = 2,70 DM	US-$	7.318,10
8.2.2.3	No. 46.003 dated 30/12/1983, 1st partial ocean shipment total value DM 219.216,87 of which 55 % rest payment = DM 120.569,27 were paid at an exchange rate 1 $ = 2,72 DM	US-$	44.326,94

8.2.2.4	No. 46.005 dated 16/2/1984, 2nd partial ocean shipment total value DM 37.561,30 of which 55 % rest payment = DM 20.658,72 were paid at an exchange rate 1 $ = DM 2,67	US-$	7.737,35
8.2.2.5	No. 46.007 dated 9/3/1984, 3rd partial ocean shipment total value DM 213.713,--, less down payment already received in an amount of DM 86.853,73 rest amount DM 126.859,27 paid at an exchange rate 1 $ = 2,67 DM	US-$	47.512,83
8.2.2.6	No. 46.008 dated 2/8/1984 airfreight consignment of spares, total value DM 449,72, paid in DM, calculated exchange rate 1 $ = 2,90 DM,countervalue	US-$	155,08
8.2.2.7	No. 46.009 dated 10/10/1984, airfreight consignment of spares, total value DM 1.787,85, paid in DM calculated exchange rate 1 $ = 3,02 DM - countervalue	US-$	592,--
8.2.2.8	No. 46.010 dated 31/10/1984, seafreight consignment of tools, total value DM 22.173,54 paid in DM calculated exchange rate 1 $ = 3,02 DM - countervalue	US-$	7.342,24

8.2.2.9	No. 46.011 dated 4/1/1985 seafreight consignment of structural steel, total value DM 14.125,55, paid at an exchange rate 1 $ = 3,35 DM	US-$	4.216,58
8.2.2.10	No. 46.013 dated 22/2/1985 seafreight consignment of spares and tool material, total value DM 22.661,98 paid at an exchange rate of 1 $ = 3,35 DM	US-$	6.764,77
8.2.2.11	No. 46.014 dated 8/3/1985 airfreight consignment of electrical spares, total value DM 1.159,22 paid at an exchange rate of 1 $ = 3,05 DM	US-$	380,07
8.2.2.12	No. 46.015 dated 27/3/1985 seafreight consignment of materials, total value DM 5.936,36 paid at an exchange rate of 1 $ = 3,05 DM	US-$	1.946,35
8.2.2.13	No. 46.016 dated 10/5/1985 airfreight consignment of electrical spares, total value DM 605,50 not yet paid assumed exchange rate 1 $ = 3,00 DM	abt.US-$	201,82
8.2.2.14	No. 46.019 dated 31/12/1985 gasoline bought for the project vehicle, total value DM 1.912,70 paid at an exchange rate 1 $ = 2,50 DM	US-$	765,08
8.2.2.15	Total amount of supplies invoiced by Fritz Werner	abt.US-$	196.906,52

8.2.3 Unspent balance for supplies, amount abt. US-$ 7.409,--

8.2.4 Invoices unpaid by UNIDO on 31/1/1986

No. 46.016 dated 10/5/1985, amount DM 605,50.

8.3 Project Debts

The unspent surplus amount out of supplies of approx. US-$ 7.409,-- stands against expenditures still to arise

8.3.1 Pump spare parts requirement still to be defined, calculated to approx. US-$ 6.800,--

8.3.2 Water treatment chemical for the pump test stand, calculated to an amount of US-$ 600,--.

8.4 Supplies Free of Charge

8.4.1 Wattmeter for pump test stand

One wattmeter 0 - 100 kW had been found not working during the assembly of the pump test stand.
A new wattmeter having a value of some DM 400,-- was delivered to FMW through Fritz Werner Free of Charge in November 1985.

8.4.2 Hoisting gear for the swivelling crane of the pump test stand

The hoisting gear comprising trolley and chain block was claimed deficient by the FMW Management during Mr. Sonntags visit to the project area in late November, 1985.

Although the presence of the hoisting gear at the time of arrival of the pump test stand has been confirmed by Mr. Bender.
Fritz Werner will - irrespective of the circumstances of disappearing of the crane hoist after its arrival - deliver a new set free of charge.
The cost of CIF Mogadishu will run up to approx. DM 1.200,--.

TERMINAL SECTION

9. CONCLUSION AND RECOMMENDATION on the Future of Foundry and Mechanical Workshop with Pump Repair Shop

9.1 State of Project

9.1.1 State on 30.6.1985

On the day of return of Fritz Werner's Technical advisor the Mechanical Workshop / Pump Repair Shop was left in sound condition, pertaining to:

- Building in proper condition
- Storage Room and Shop Office installed
- Equipment mechanically, electrically (few exceptions) hydraulically, and pneumatically installed and in working order
- A decent outfit of tools, fixtures, measuring instruments, raw materials and standard parts being at hand
- The personnel having been rendered general practical and theoretical training

One discipline, training in pump repair and pump testing, sad to say, has gone short under the prevailing circumstances.

9.1.2 Preservation of State attained

For the near future the state on 30/6/1985 can be assumed to remain preserved under the care of Dr. Nihat Kinikoglu, CAO, and his team, assinged to Foundry and Mechanical Workshop under a development programme of UNIDO, Metallurgical Department.

9.2 Further Technical Assistance

In June, 1985, Foundry and Mechanical Workshop requested a further technical assistance period of 6 man-months from the Ministry of Industry, to be passed on by them to UN Res. Rep. Mogadishu and UNIDO.

Basing on their experience made in the project, Fritz Werner International do not deem it wise to comply with this request before the following prerequisites have been coped with:

9.2.1 Partial Recovery of the Foundry

Not even simple spare parts had been able to be produced in the foundry for quality reasons during the stay of the expert in the project area. The services of the foundry must be available on account of the large variety of pump makes and types in use in Somalia.

9.2.2 Availability of pumps needing Repair

No efficient pump reapair training can be rendered without a sufficient number of training items.

The problem is likely to be satisfyingly solved only after hydroeconomical activities have been uniformed under one Authority, say Ministry of Mineral and Water Resources.

9.2.3 Additional Training of Key Personnel Abroad

It is recommended to send the foreman of the Mechanical Workshop/ Pump Repair Department, Mr. Abdulkadir Jama Abas, to Europe anew for a minimum period of 6 months. Precondition would have to be that his salary should continue to be paid to his family during his absense, by Foundry and Mechanical Workshop or the Ministry of Industry. This was not the case during his first stay in Europe from August to November 1983.

The allowance paid to him during his stay in Europe by the receiving party be decent in order to give him a high grade of motivation - for the future sake of his home country.

9.2.4 Training of Workshop Personnel at Place

Mechanical skills and theoretical knowledge of FMS's personnel need further backing. The German organisation "GTZ Deutsche Gesellschaft für Technische Zusammenarbeit" has established in Mogadishu a vocational training centre which has gone into operation end of 1985.

Training facilities will be available in the following sectors:

- Welding
- General mechanique
- General electrics
- Machine tools operation

To knowledge of Fritz Werner who established contacts with GTZ at site the training is rendered free of charge, salary payment, however having to be made by the delegating authority.

FMW cannot be expected to dispose of sufficient capital and it is therefore advised that the Ministry of Industry takes over the expenditure for salaries of FMW personnel to be trained.

9.2.5 Introduction of a Functioning Organisation

An organisation of working service was not discovered to exist during the phase of project implementation. It cannot be expected to be imposed without outside help. Outside help should comprise

- Organisation
- Logistics
- Design and Construction
- Sales Service
- Accounting

9.3 Useful Complement

The project in its present phase lacks facilities of electrical repair. Before undertaking further extending steps a motor/transformer recoiling and repair shop should be added to the mechanical pump repair section.

9.4 Further Steps

Further steps of project enrichment provide

- Production of pump components in the Factory and Mechanical Workshop and assembly
- Autonomous production of pumps by FMW

Prerequisites are set prior to the further steps as follows:

9.4.1 Complete recovery of the foundry having been performed

9.4.2 Electric power supply having become reliable

9.4.3 Every step of prerequisites listed before having been made

10. GENERAL REMARKS / ADVICE

Similar projects in developping countries will bring up problems alike the ones described in this report. It will ease the lives of project area personnel if the project allows them to spent some money out of the funds for incentives for good work of project assigned local personnel.

Award regulation as above is practicized by other organisations of development aid.

ANNEXES

List of Annexes

1 Drawing No. 2700 - 2B:
As-built situation of the Workshop building after the installation of glass and perforated bricks

2 Layout No. 2700 - 5 with legend:
As-built status of the Workshop/Pump Repair Shop

3 Layout No. 2700 - 1a with legend:
Original equipment situation of the Mechanical Workshop,
description of machine tools installed in the Steel Structure Department

4 Photographs documenting the original Status of project and stages of progress

5 Minutes of Meetings held with the Management of Foundry and Mechanical Workshop

A 29/05/1983

B 03/09/1984

C 28/11/1984

6 Sub-article 5.2.4 of Preliminary Report dated 18/8/1983

7 Training in Germany

A Tentative Programm

B Revised Programme

C Individual Judgements on the Trainees

D Certificates of Training

ANNEXURE 1

SOME FIGURES
OF THIS DOCUMENT
ARE TOO LARGE
FOR MICROFICHING
AND WILL NOT
BE PHOTOGRAPHED.

ANNEXURE 2

Annexure 2

Foundry and Mechanical Workshop
Mogadiscio / Somalia

Legend to Layout No. 2700-5:

As-built situation of Mechanical Workshop / Pump Repair Shop on 30.6.1985
- Description of Main Equipment -

1. Supervisor's and Shop Office

   1.1 Office made of brick work, glassbrick windows
   1.2 Desks
   1.3 filing cabinets

2. Spare parts store

   2.1 Shelves

3. Tool shop

   3.1 Shelves

} fenced with lockable doors

4. Reception of repairworthy pumps

   4.1 pallets

5. Diagnosis, dismantling, cleaning

   5.1 Swivelling, column hoist 1000 kp/3m
   5.2 Cleaning basin
   5.3 Working tables
   5.4 Sand blast chamber

6. Dip painting basin

7. Motor repair (electric)

7.1 Mobile working table
7.2 Lockable cabinet

8. Pump re-assembly

8.1 Swivelling column hoist 1000 kp/3 m
8.2 Working tables
8.3 Bench drilling M/C INSTITUT-ZAS, Zagreb
8.4 Spindle Press 40 t

9. Testing Stand

9.1 Swivelling column crane
1000 kp/2,5 m
9.2 Testing basin, testing equipment
9.3 Electric control and display
9.4 Testing motors and measuring section

10. Shaping section

10.1 Shaper MAJEVICA
10.2 Shaper NOLL

11. Turning section

11.1 VOGHERA engine lathe BMP 300 x 3000 mm
11.2 PRVOMAJSKA engine lathe TNP 250 x 3000 mm
11.3 PRVOMAJSKA engine lathe TNP 250 x 2000 mm
11.4 USSR engine lathe 6 H 20 220 x 1000 mm
11.5 USSR engine lathe 1 K 62 220 x 1500 mm
11.6 STOREBRO engine lathe GK 195 195 x 1000 mm
11.7 VOGHERA engine lathe 22 220 x 1000 mm

12. Grinding section

12.1 Universal tool grinding M/C 1000 x 130 mm

13. Welding section

13.1 Welding table
13.2 Welding transformer
13.3 Belt grinding machine
13.4 WIKSTROM Bending and ram press
13.5 Gas welding and cutting equipment
13.2/5 Extractor fan

14. Preparatory section

14.1 POBEDA Band saw
14.4 CONTINENTAL Hack saw

15. Tool and fixture making section

15.1 Marking table
15.2 Column Drilling M/C 30 mm
15.3 ZEUS Universal Milling M/C 900 x 200 mm
15.4 ZEUS Universal Milling M/C 1200 x 200 mm

16. Smithy

16.1 Swage block
16.2 Straightening plate
16.3 NABER annealing furnace
16.4 Forge fire
16.5 Anvil
16.6 Double wheel grinding stand

17. Compressor

The following equipment, originally listendin Layout No. 2700 - 3 (contained in annexure 6 to our Preliminary Report dated 18/7/1983)
have been left out of Layout No. 2700 - 5:

2.2/3.2 Working tables

Reasons: Their location in the Workshop is not fixed

12.2 Double wheel stand 400 mm wheel dia

Reasons: As a new double wheel grinding stand has been supplied under the project, the existing stand was transferred to the Steel Structure Department

14.2 USSR threading machine

Reasons: The machine was sorted out due to electrical defects and absolute lack of tooling. A new mobile threading machine was supplied under the project which can take the duties of the sorted-out machine

14.3 Cutting-off machine

Reasons: This machine was an own make of FMW. It lacked its motor and protective devices. For safety purpose the incomplete machine was sorted out by Mr. Bender. The works once intended to be done on the machine, can be performed by angular grinders, supplied under the project.

ANNEXURE 3

Foundry and Mechanical Workshop,
Mogadiscio / Somalia

Legend to Layout No. 2700-1a existing equipment ot the workshop

No. 1 Storebro (Sweden) engine lathe
mod. GK 195
195 x 1000 mm, 37-1600 R.P.M.

No. 2 USSR engine lathe
mod. 1 K 62
220 x 1500 mm 20-2000 R.P.M.

No. 3 USSR engine lathe
mod. 6 H 20
220 x 1000 mm 12,5 - 1660 R.P.M.

No. 4 PRVOMAJSKA (Yug.) engine lathe
System NILES GDR
mod. TNP 250 x 2000 m, 16-2240 R.P.M.

No. 5 VOGHERA (Italy) engine lathe
type 22, 220 x 1000 m with half gap
44-1500 R.P.M.

No. 6 Universal tool grinding M/C
make not identifiable
table size 1000 x 130

No. 7 PRVOMAJSKA engine lathe
mod. TNP 250 x 3000 mm (NILES)
16-2240 R.P.M.

No. 8 VOGHERA engine lathe
mod. BMP, 300 x 3000 mm,
20 - 1500 R.P.M.

No. 9 Hand operated spindle press
own construction

No.10 NABER (Germany)
electric annealing furnace
mod. N 41 with temperature
processor TP1 (built 1982)
outer dimensions 800 x 600 x 800 mm

No.11 Shaper NOLL ram travel
approx. 1000 mm, table size
900 x 400 mm

No.12 Compressor Leccato Att 'Auto (Italy)
no techn. data

No.13 Shaper MAJEVICA (Yug.) 1974
ram travel appr. 450 mm,
table size 450 x 300 mm

No.14 Metal hack saw Continental 250
blade length 420 mm

No.15 Bench drilling M/C INSITUT
ZAS Junnost Zagreb, capacity 18 mm

No.16 BR WIKSTROM (SWEDEN) Bending and
ram press 20 t,
bending length 560 mm, gap 500 mm

No.17 USSR Columen drilling M/C
capacity approx. 20 mm (not working)

No.18 ZEUS di Bonfiglio (Italy)
Universal milling M/C
table size 900 x 200 mm,
autom. table feeds

No.19 ZEUS universal milling M/C
table size 1200 x 200 mm,
with dividing head

No.20 Double grinding wheel stand

No.21 inclined Metalbandsaw POBEDA
Novi sad (Yug.) without
saw band, coolir - equipment
defect, diam. of wheels 360 mm,
distance of axes 1030 mm

No.22 USSR Threading M/C
C m II (no techn. data, not working)

No.23 Cutting M/C, own construction,
not working

Annexure 3

Foundry and Mechanical Workshop
Mogadiscio / Somalia

Further machine tools installed in the
Steel Structure Department (Foundry Building)

No. 1 Radial Drilling M/C LIVNICA (Yug.)
Type RB-4, drilling capacity 40 mm,
spindle speeds 55 - 2558 R.P.M.

No. 2 Guillotine Shear JELSINGRAD (Yug.)
5 x 2500 mm (42 kg/cm²)
48 strokes/min.

No. 3 Guillotine Shear GÖTENEDS (Sweden)
type 620, 6 x 2000 mm (1981)

No. 4 Profile and bar shear
Construzioni Mechanische AMES (Italy)

No. 5 Three roller sheet metal round-
bending M/C (Yug.)
6 x 2000 mm, 6 - 22 R.P.M.

No. 6 Universal milling M/C (make not
identifiable) table size approx.
1000 x 220 mm, 40 - 2000 R.P.M.

ANNEXURE 4

Legend to Photos documentating the Original Status of Project and Stages of Progress

1. Scenes of Original Status found in May 1983

Photo No.

1.1 Partial view of Foundry side wall looking north-east, centre right: charcoal store, left to it: brass scrap store foreground left: steel and cast iron scrap part store

1.2 View from Foundry Building to longitudinal wall of Mechanical Workshop Building, looking south-west.
Centre: various brass scrap piles (gun shells)

1.3 Inside View of Mechanical Workshop Building: Yougoslavian Engine lathe (item No. 7 of basic layout No. 2700-1a)

1.4 Inside view of Mechanical Workshop Building: Zeus Universal Milling M/C 1200 x 200 (item No. 19 of basic layout No. 2700-1a)

1.5 Inside view of Mechanical Workshop Building (south-east to north west)

1.6 Inside view of Mechanical Workshop Building (north-west to south-east)

1.7 Assembly of Shaping Machines (item Nos. 11 and 13 of basic layout No. 2700-1a)

1.8 PRVOMAJSKA engine lathe 250 x 2000 mm (item No. 4 of basic layout No. 2700-1a)

2. Scenes of Status found in February 1984

Photo No.

2.1 South-east gable wall of Foundry building
foreground: metal sheet tanks and containers produced by the Steel Structure Department

2.2 Charcoal pile between Foundry and Mechanical Workshop building

2.3 Pig iron and scrap pile outside the Foundry building

2.4 Arrival of first shipment at site (1.3.1984):
unloading of glass bricks from the container

2.5 Unloading of equipment

2.6 Storage of equipment in the Mechanical Workshop building

2.7 All items of first shipment stowed away in the workshop building

3. Scenes of progress as found in January 1985
(the section Nos. refer to final layout No. 2700-5)

3.1 South-east side elevation of Mechanical Workshop building with glass-brick windows inserted

3.2 Inside view north-west to south-east (machinery rearranged and completed by new deliveries)

3.3 Detail of damaged hall floor

3.4 Test stand basin (section 9)

3.5 Inside view from south-east to north-west
foreground: test stand basin
left: shop office

3.6 Close-up view of the 2 swivelling cranes installed in the pump dismantling section (5) and pump re-assembly section (8)

3.7 View of tool and fixture making section (15) and smithy (16)

3.8 Foreground left: View of preparatory section (14)
Background right: part of turning section

3.9 Repairneedy centrifugal pump

3.10 Series of semi-cannibalized GDR made Diesel engine pumps (VEB Dieselmotorenwerk Schönebeck/VEB Pumpenwerk Halle) found at ONAT Motor Repair Shop Afgoi

4. Scenes of progress, state of project as in June 1985
(the section and item Nos. refer to final layout No. 2700-5)

4.1 + 4.2 Fenced storage area and FMW made shelves (sections 2 and 3)

4.3 Inside view of supervisor's and shop office (section 1)

4.4 Submersible pump for repair
background right: threading machine (item 20.6)

4.5 Part view of diagnosis, dismantling, cleaning section:
foreground (left): mobile lifting table (item 7.1)
background from left to right:

compressor (item 17.1), cleaning basin (item 5.2), sand blast chamber (item 5.4)

4.6 Part view of tool and fixture making section (15) center: marking table (item 15.1)

4.7 Tool and fixture making section: milling machines (items 15.3 and 15.4)

4.8 Details of pump test stand (section 9) Control and display cabinets

5. State of November 1985 (section and item Nos. refer to final layout No. 2700-5)

5.1 + 5.2 Area between Workshop building and Foundry building

5.3 Supervisor's and shop office (section 1)

5.4 Storage area (sections 2 and 3): view from between shop office and longitudinal wall of workshop building

5.5 View from main aisle into storage area and shop office (sections 2 and 1) foreground left: spindle press (item 8.4)

5.6 + 5.7 + 5.8 Detail views of pump test stand (section 9) control and display cabinets (5.7 is same scene as 4.8)

5.9 Detail view of test stand (section 9)
left tank battery: quantity measuring station
right portion: total head measuring station and swivelling column crane

5.10 Scenes of pump dismantling, repair and pump re-
5.11 assembly Sections (Section Nos. 5, 7, 8)
5.12
5.13
5.14
5.15

5.16 Tool and fixture making section (section 15)

5.17 Partial view of turning section (section 11)

5.18 Smithy (section 16)

5.19 Welding section (section 13)

1. Original Status May 1983

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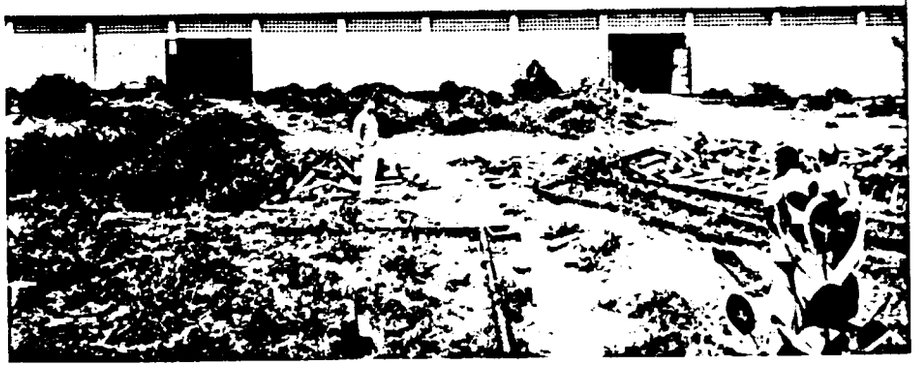

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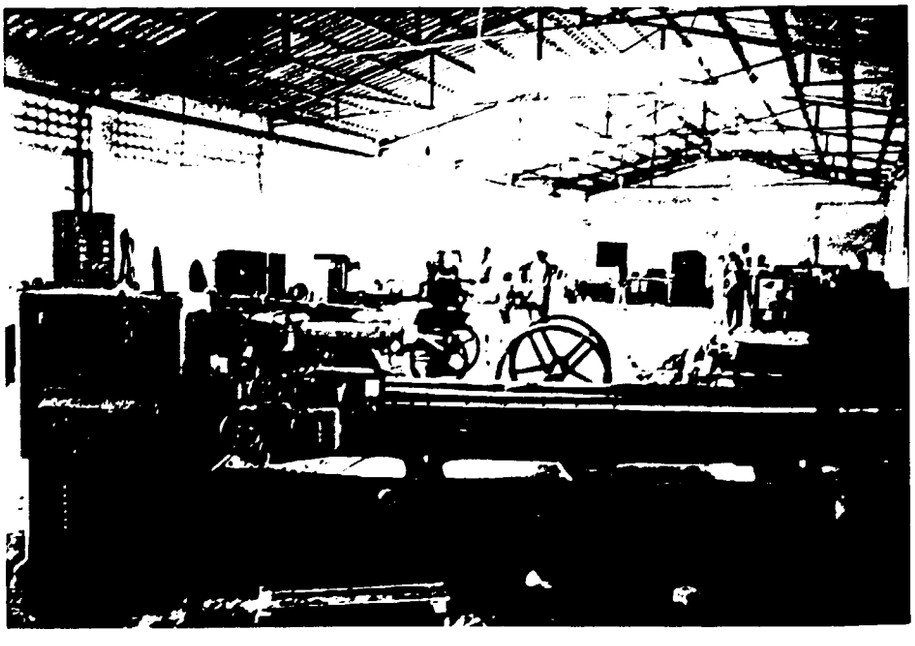

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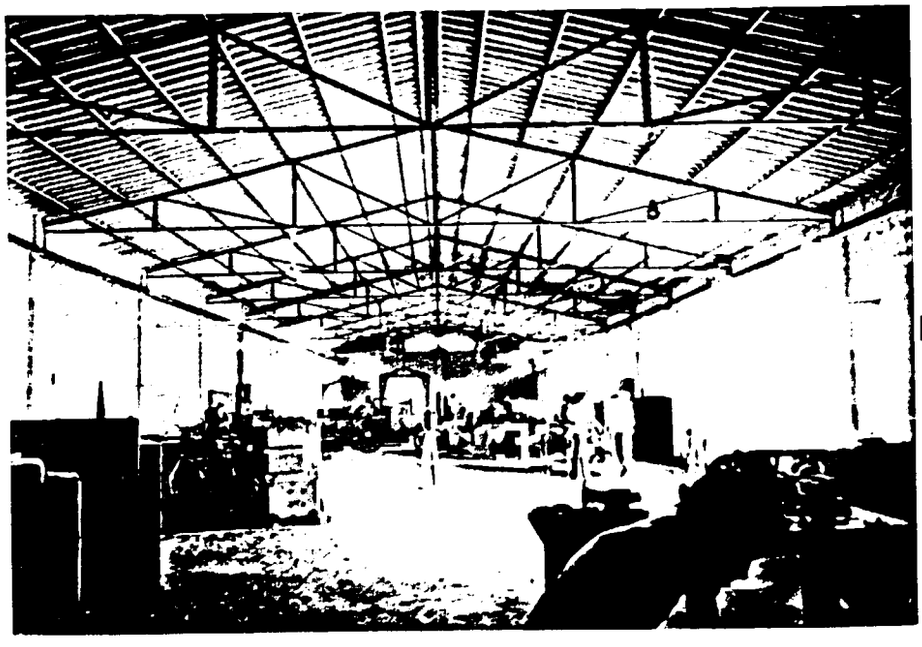

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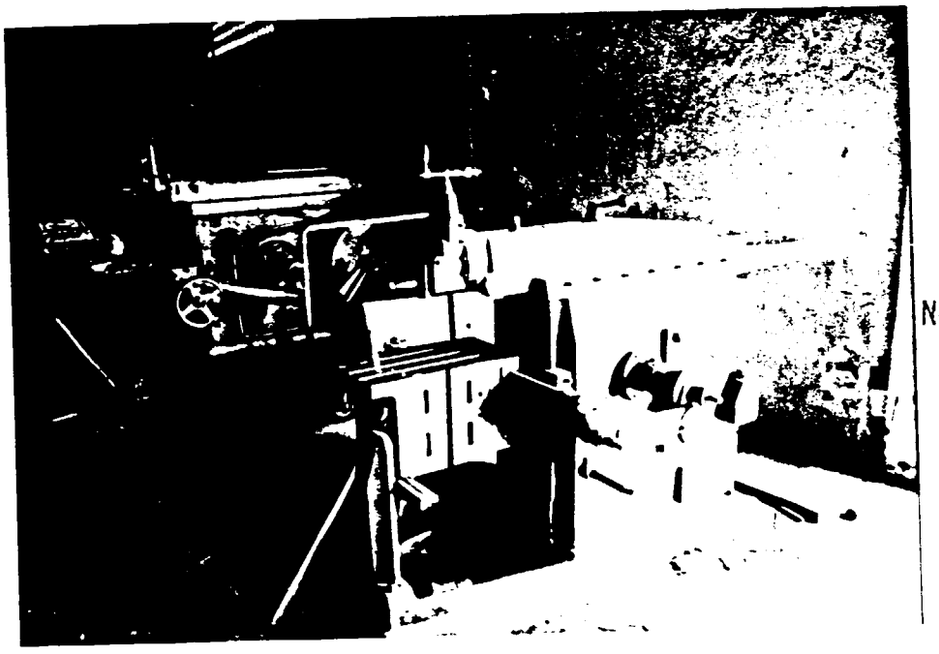

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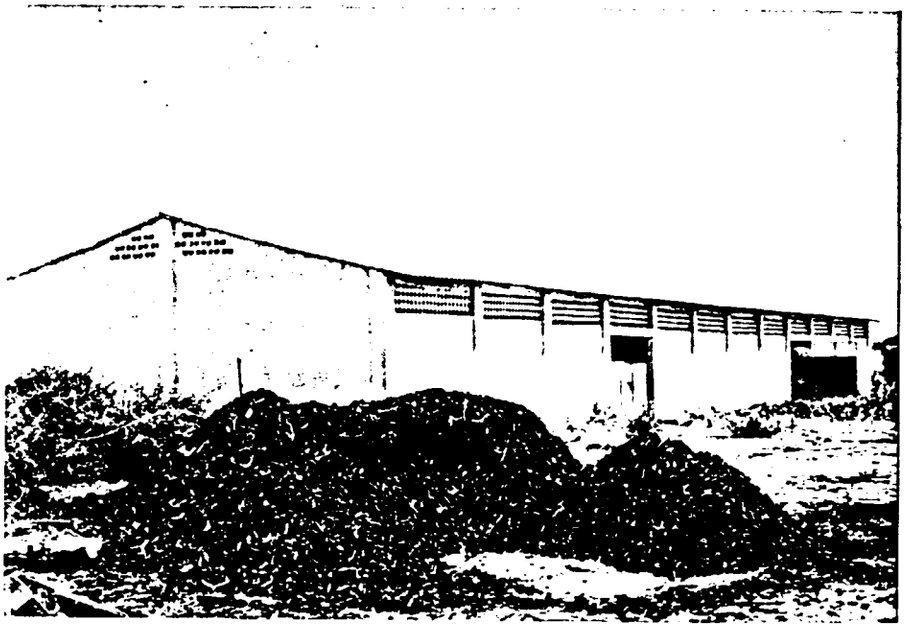

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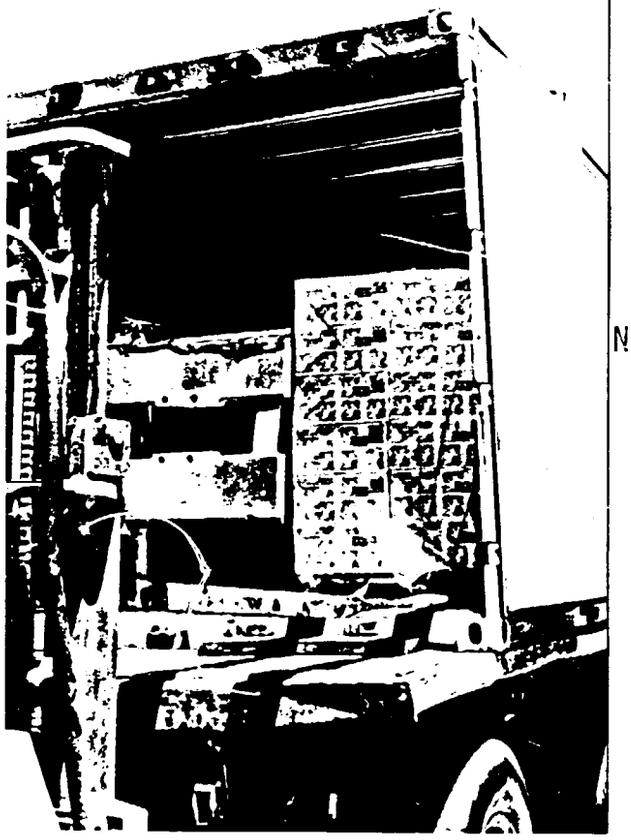

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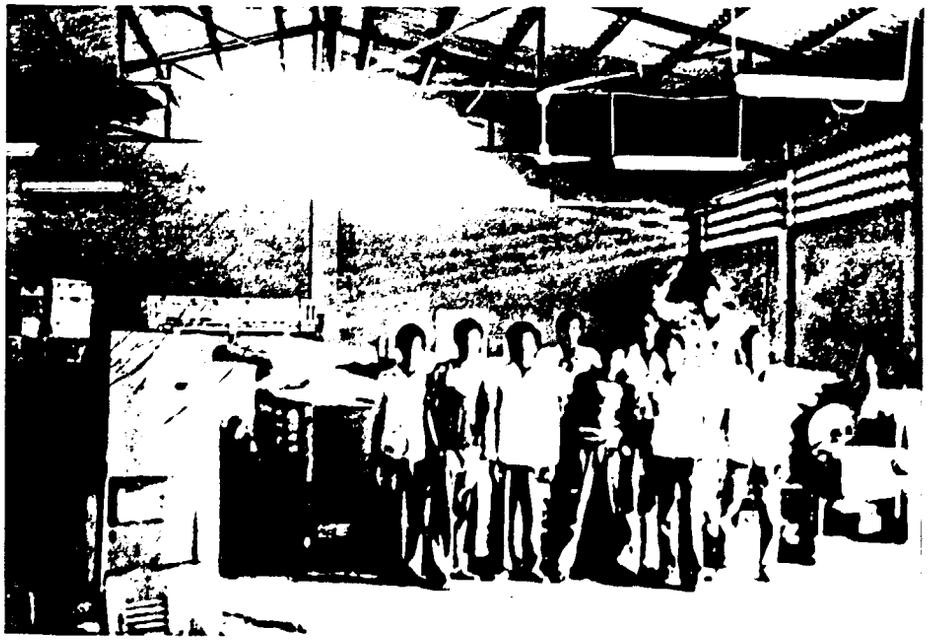

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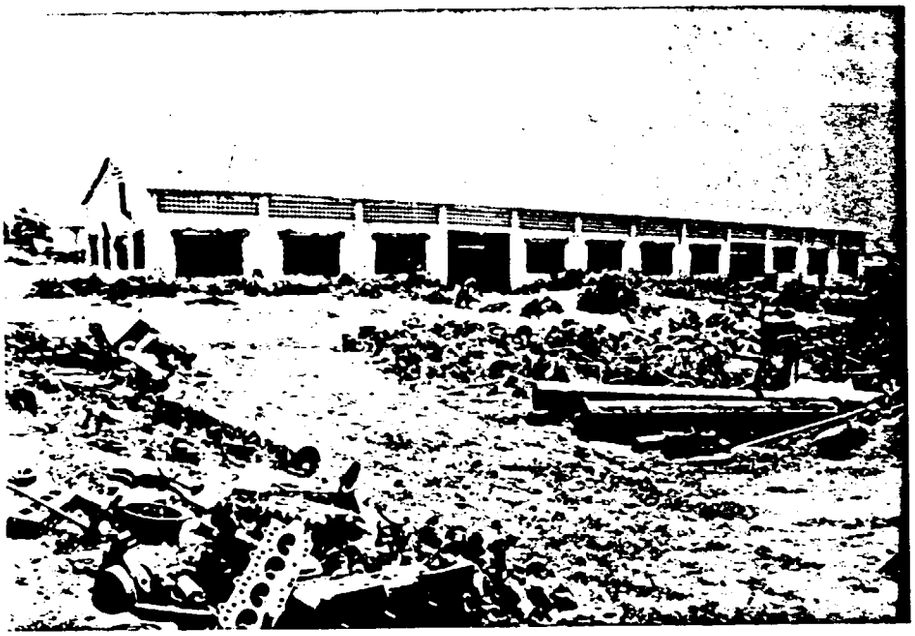

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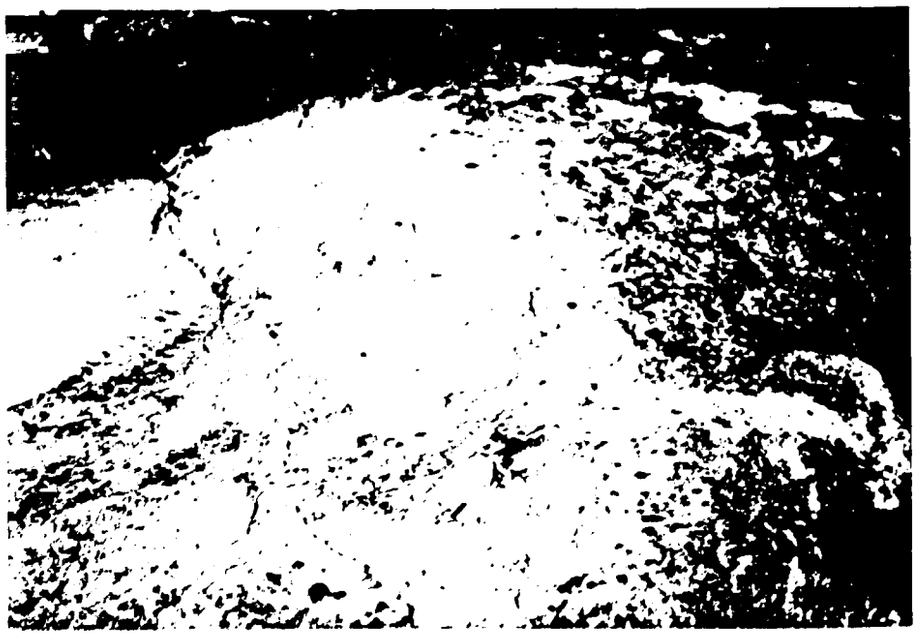

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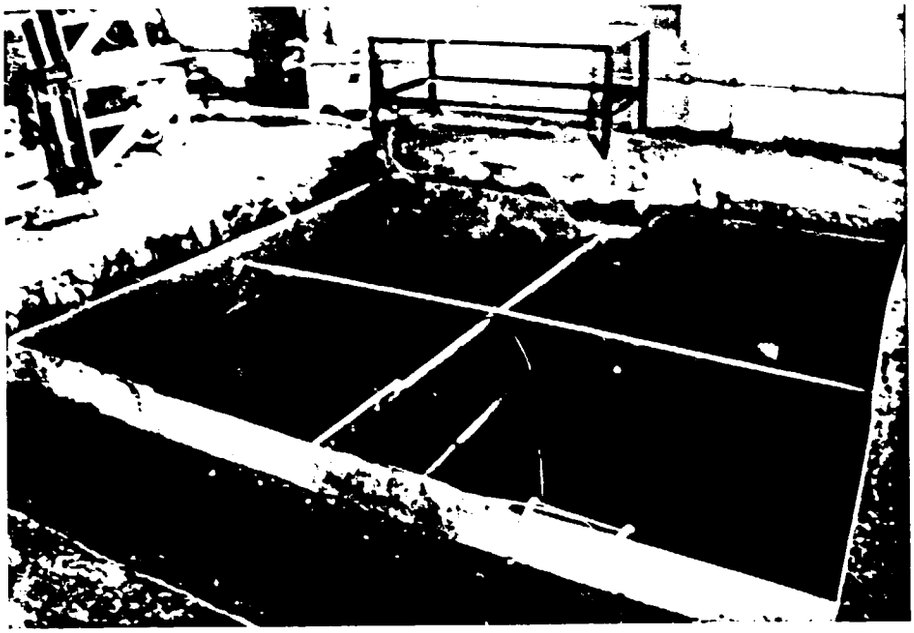

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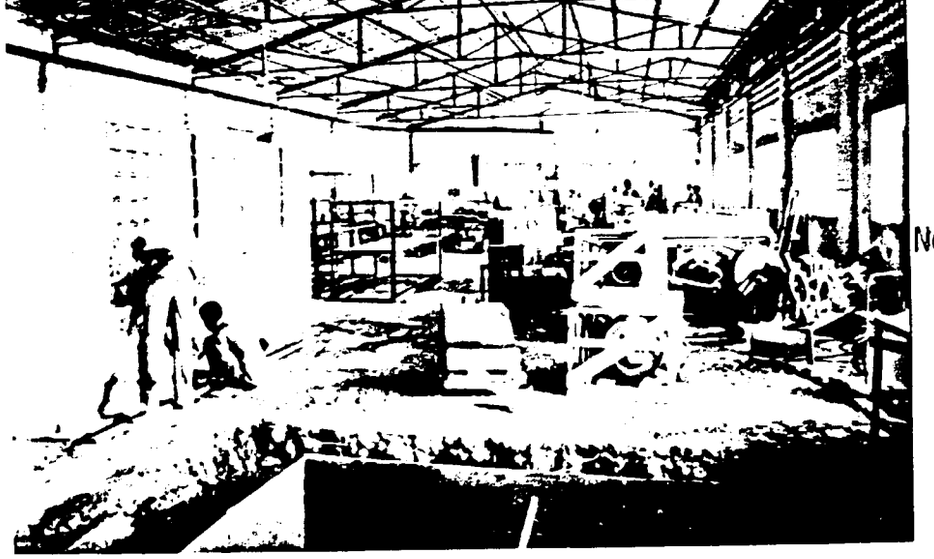

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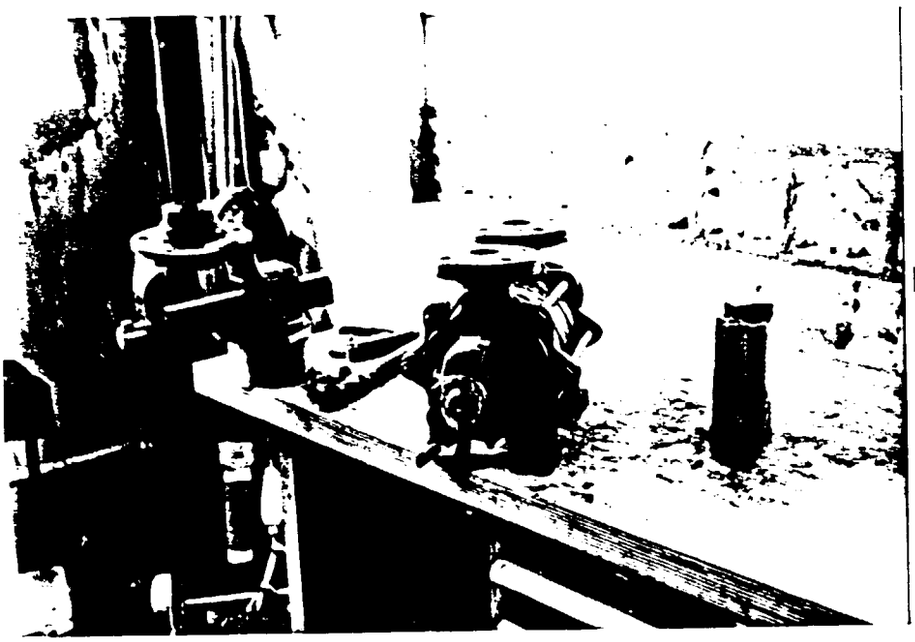

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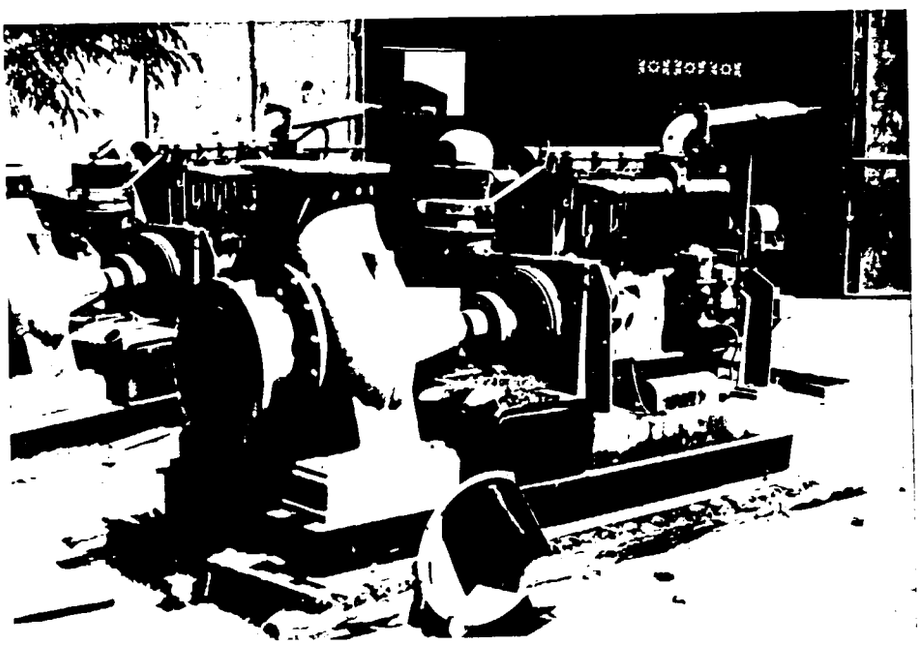

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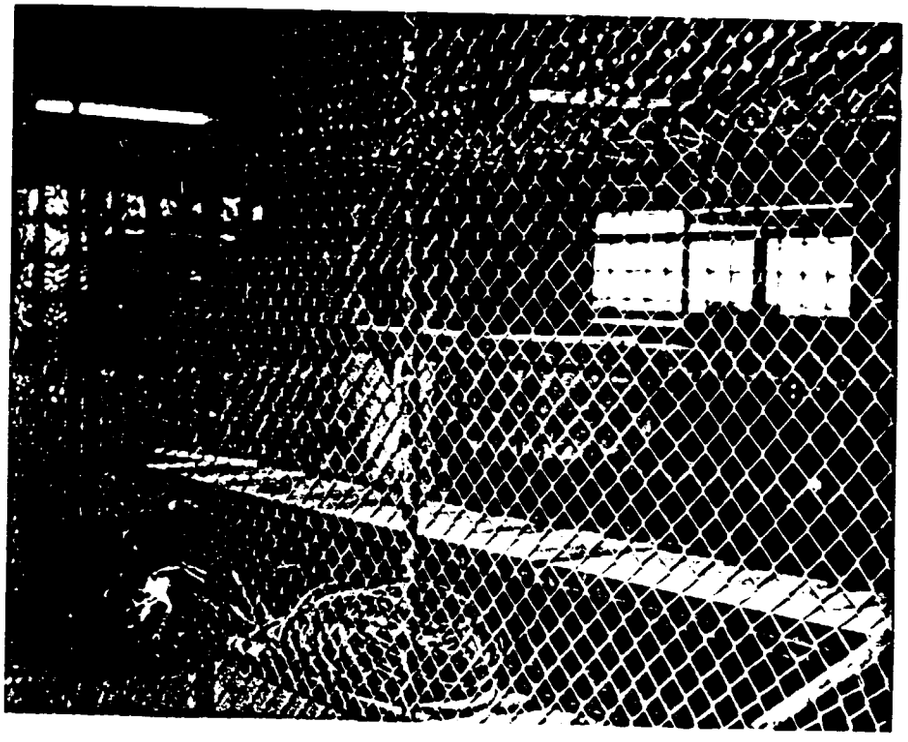

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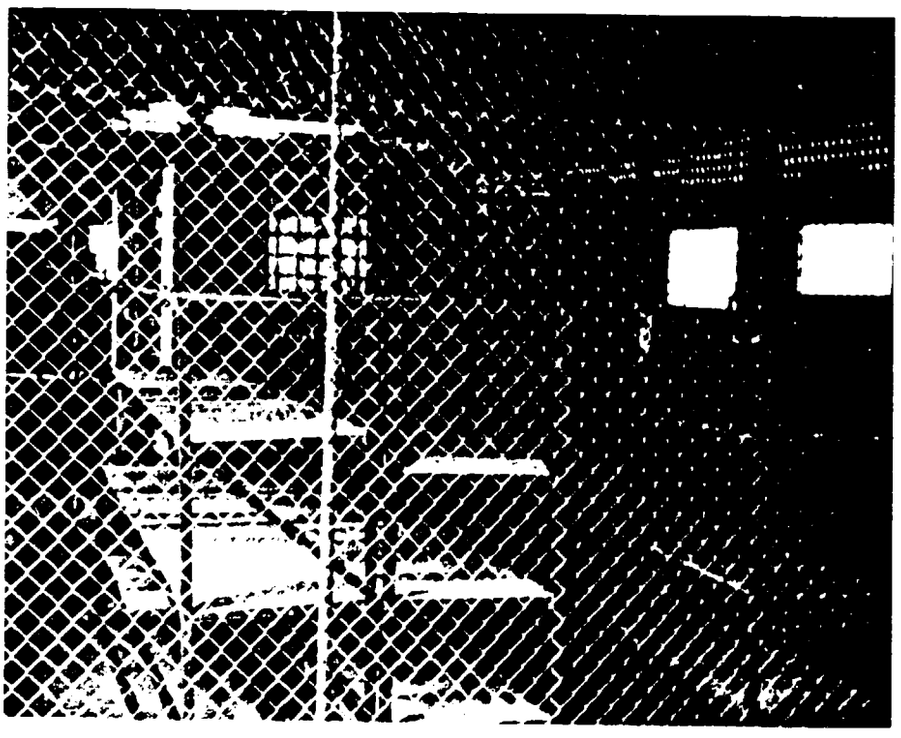

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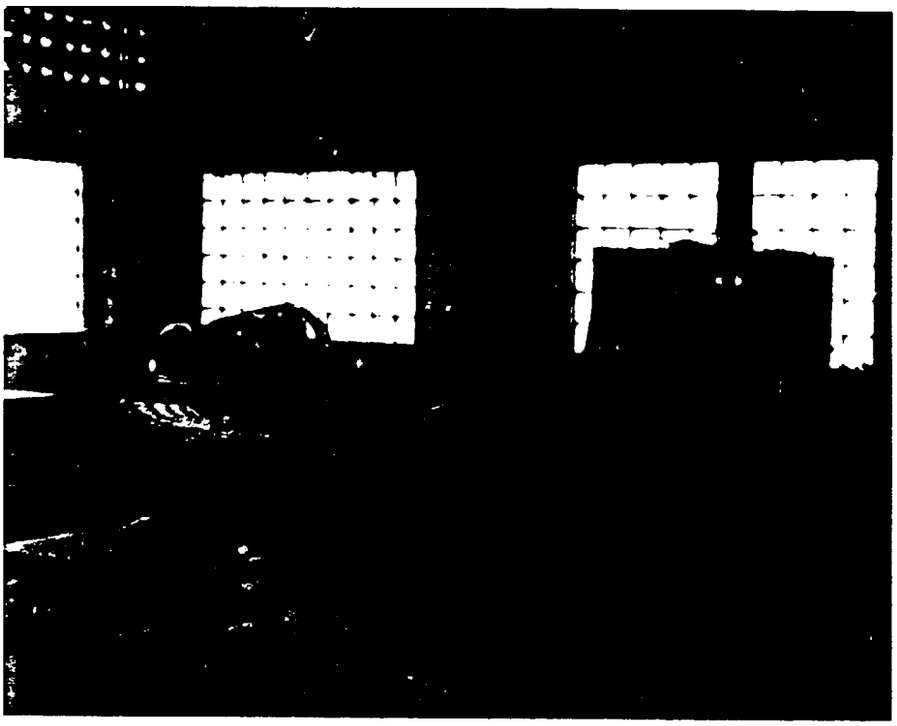

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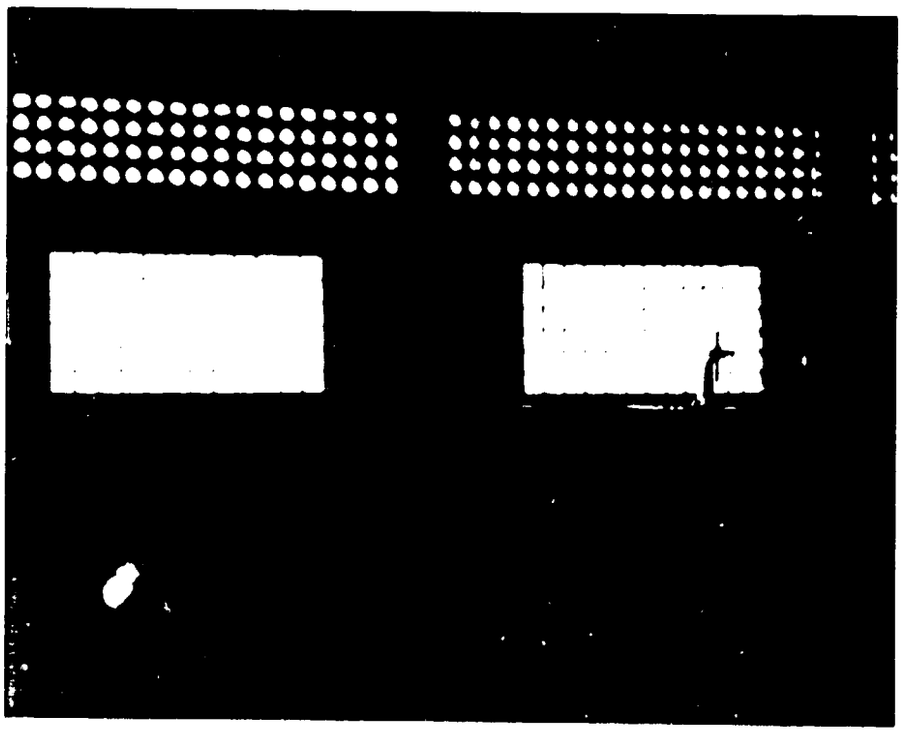

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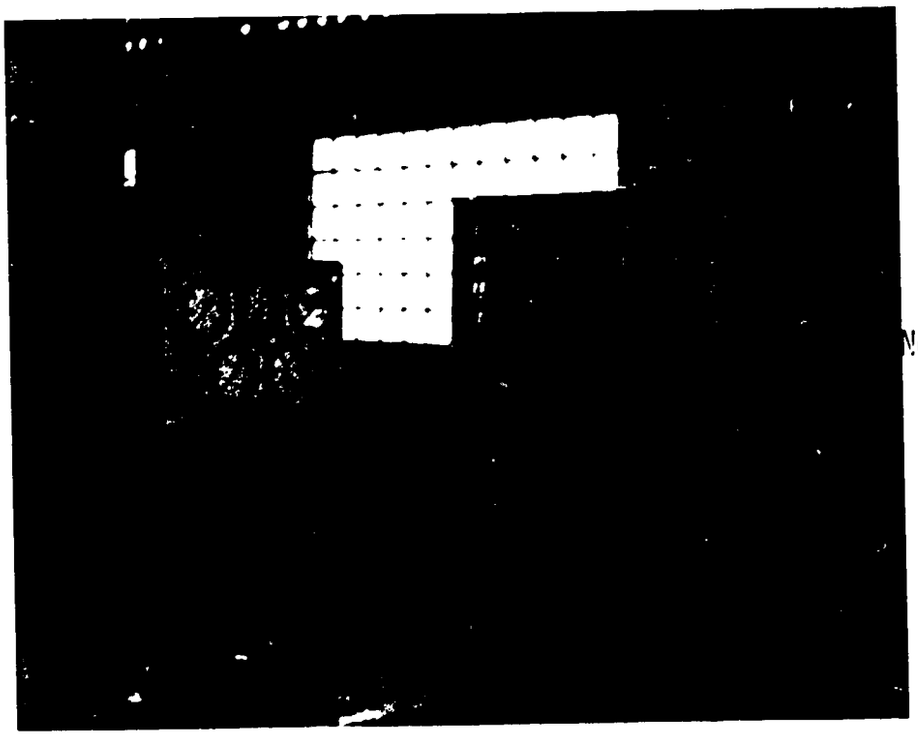

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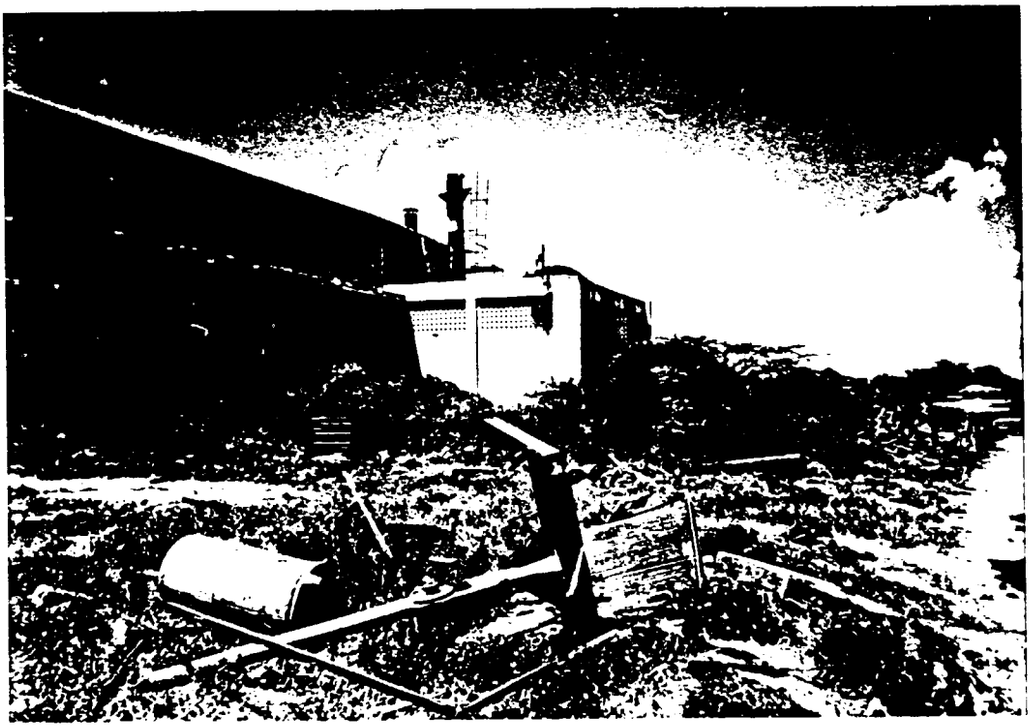

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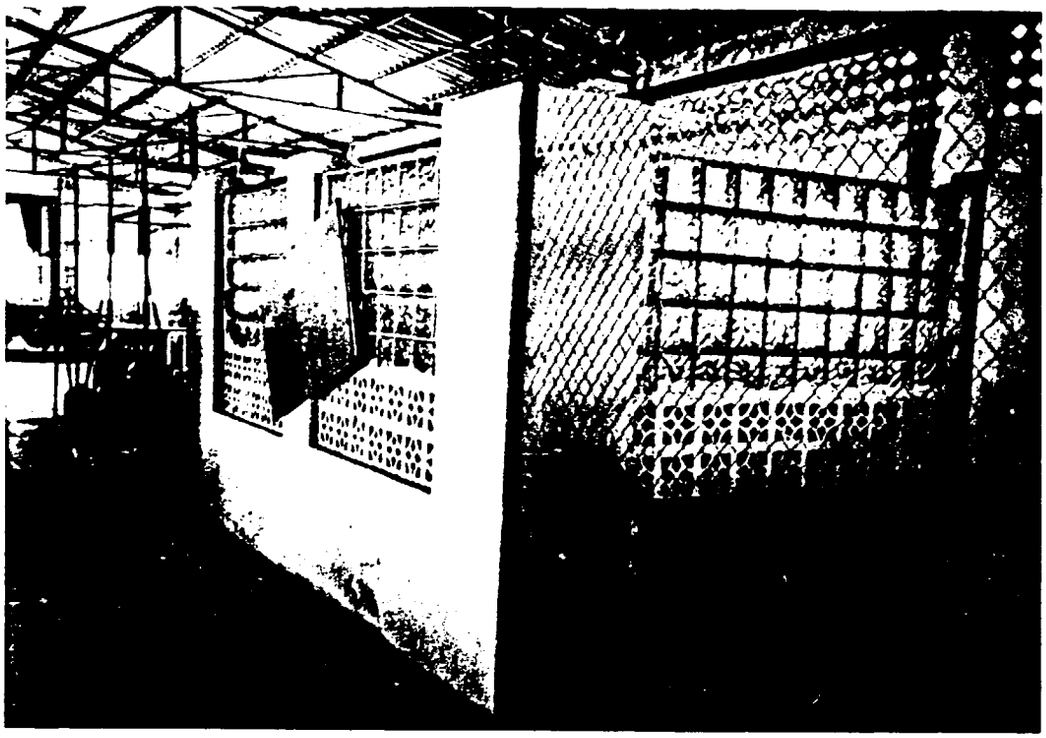

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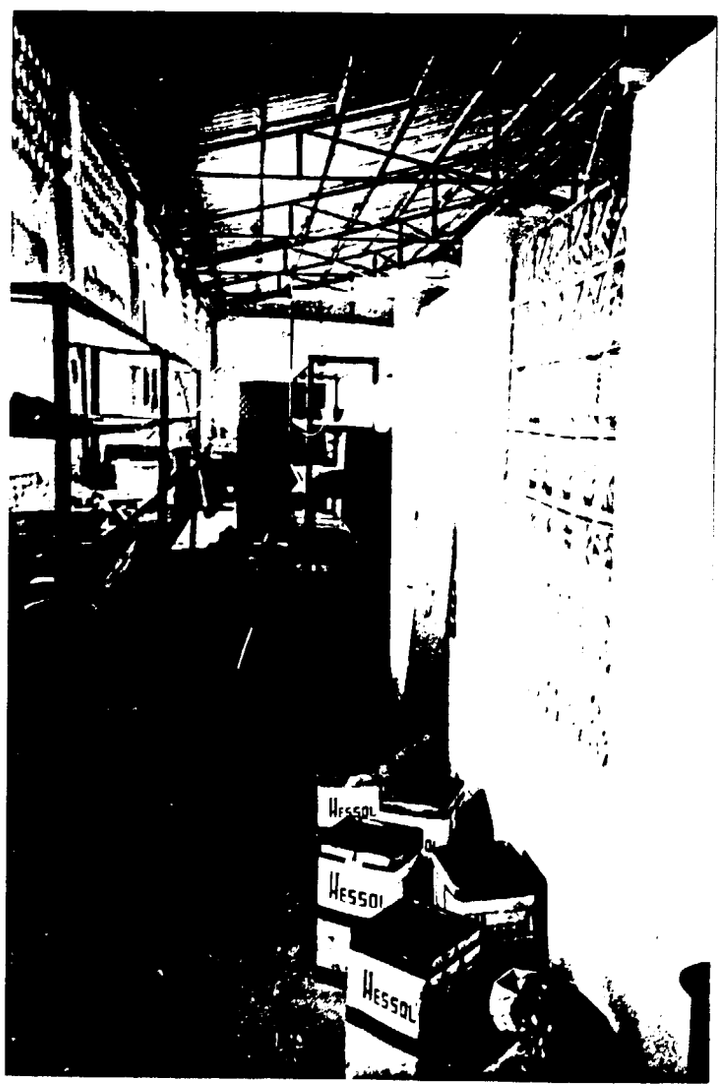

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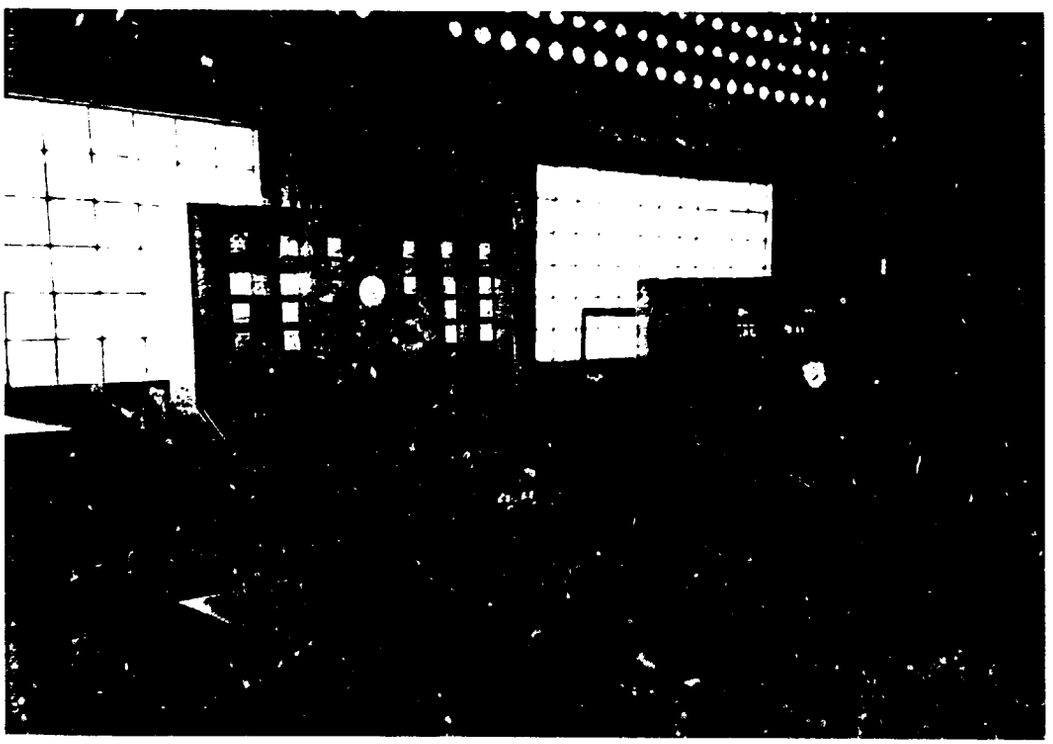

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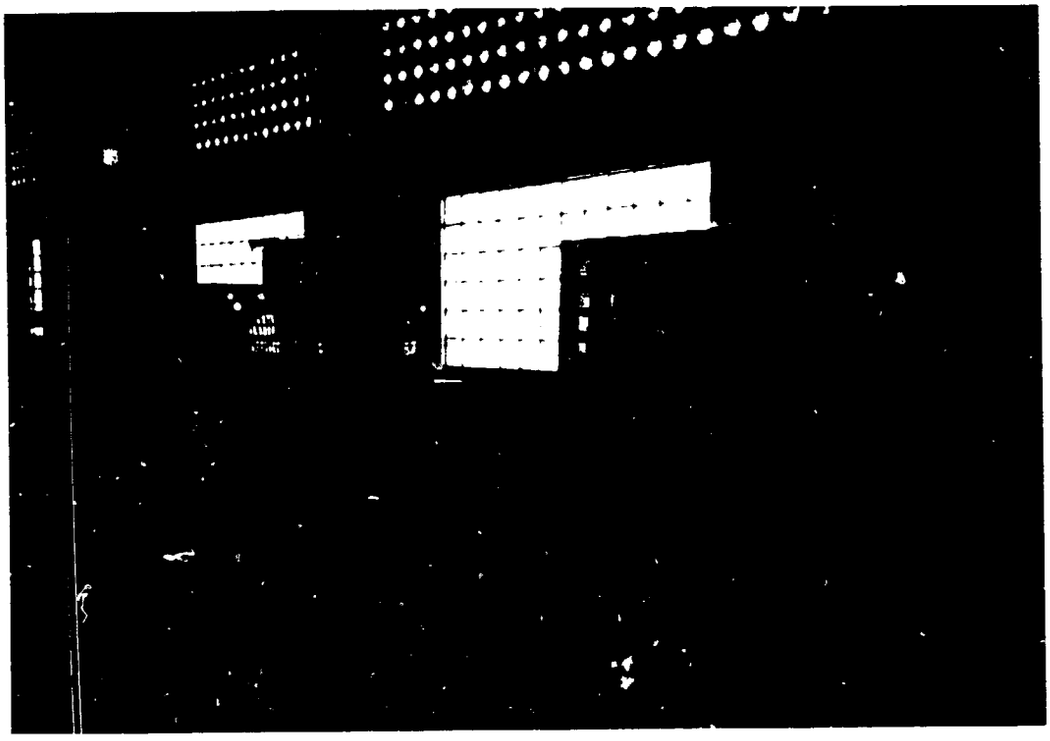

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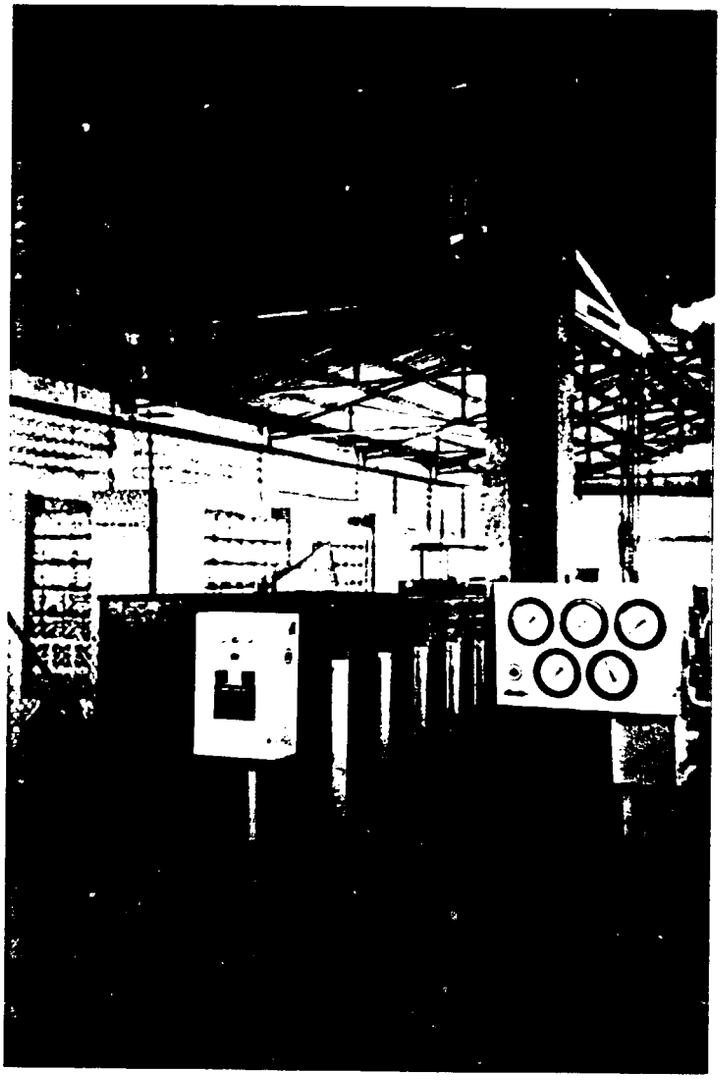

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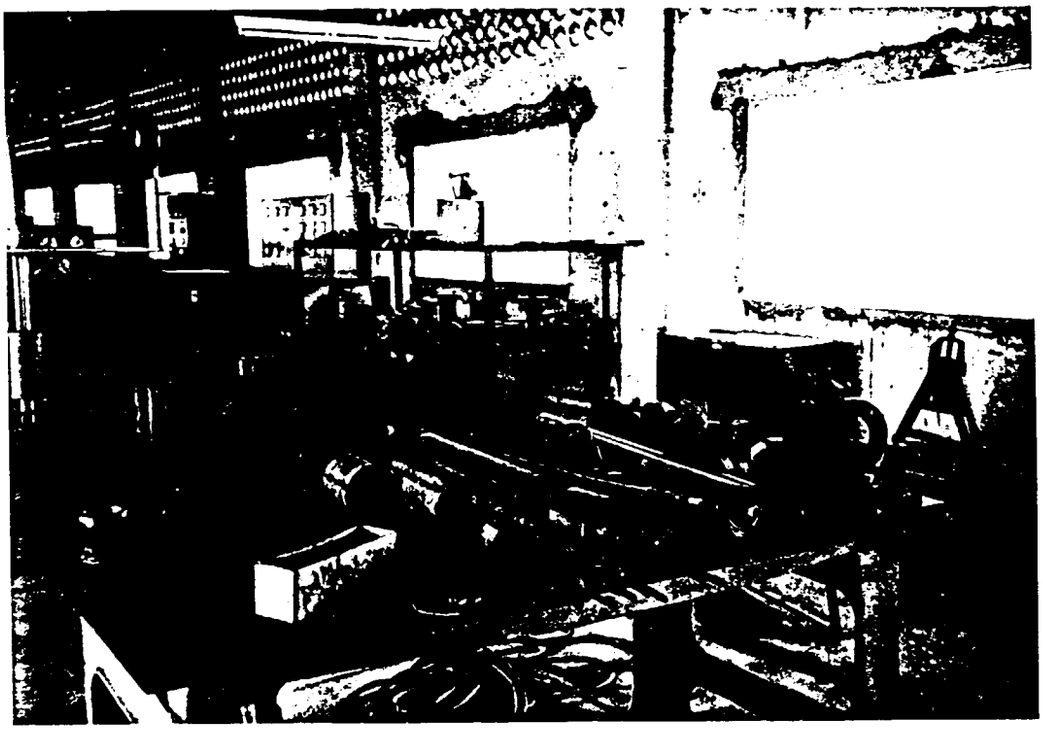

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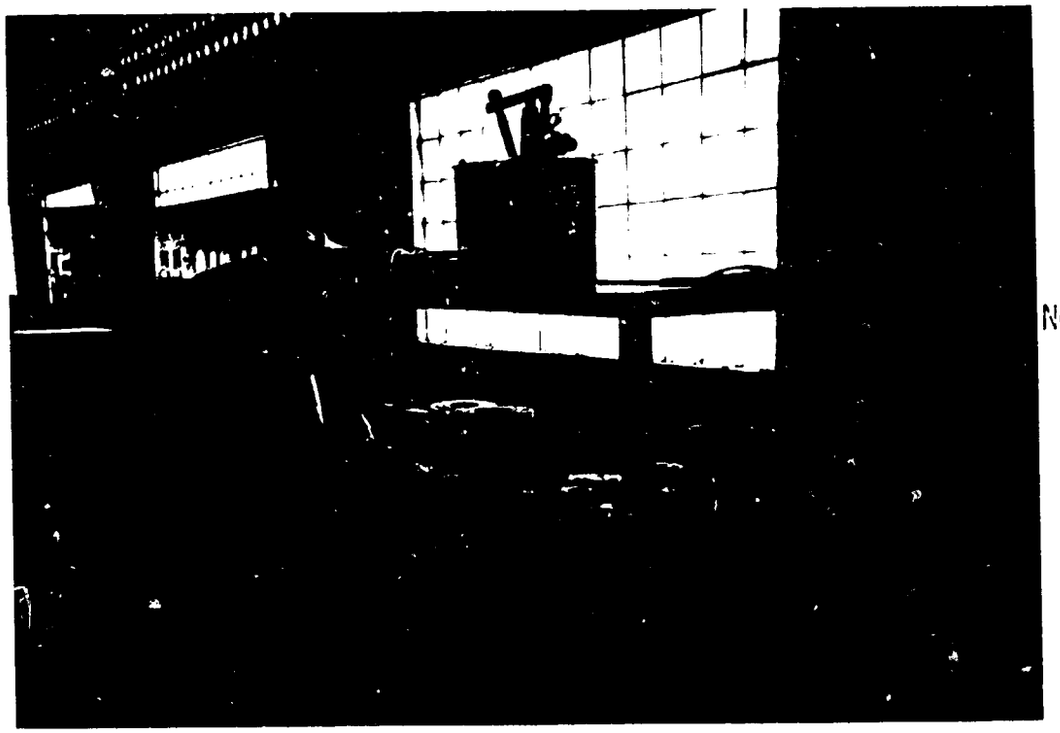

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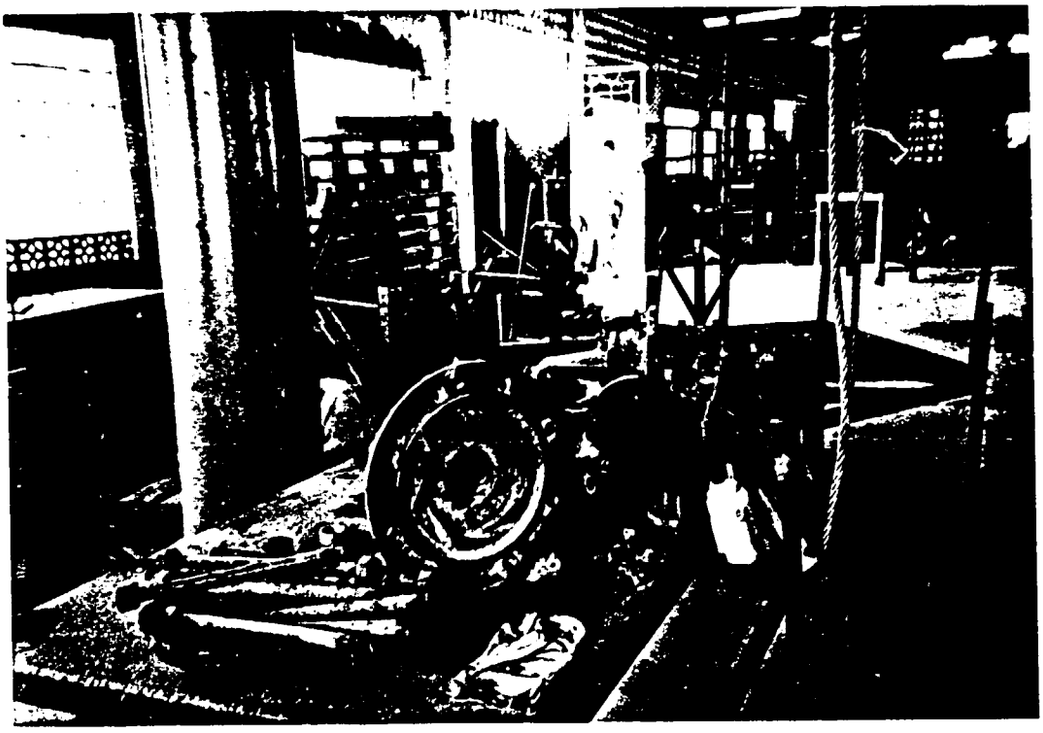

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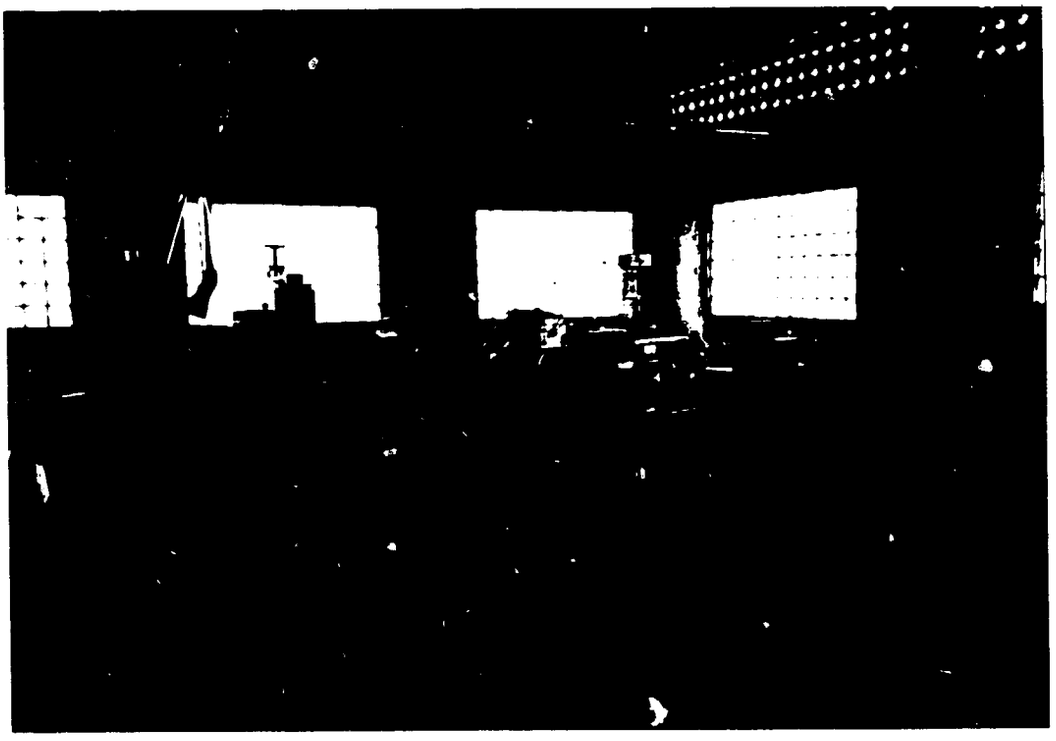


No.5.19

ANNEXURE 5

Annexure 5 A

29th May, 1983

MINUTES OF MEETING

Subject: UNIDO Contract No. 83/23 - US/SOM/80/083 with Fritz Werner Export GmbH, Wiesbaden, F.R. Germany (referred to as "FWE") - Implementation of a pump repair shop in the existing Foundry and Mechanical Workshop/ Warshadda Birta Shubda at Mogadiscio/Somalia (referred to as "WBS")

A Final meeting was held in the Office of the Foundry and Mechanical Workshop on May 29th, 1983, following the survey carried out by FWE experts Mr. Anton and Mr. Kramer from May 22 to May 28, 1983.
The meeting was attended by:

Mr. M.A. Dahir	General Manager WBS
Mr. A.H. Ismail	Machine Shop Engineer WBS
Mr. R.J. Raymond	UNDP Coordinator
Mr. H.R. Anton	Project Manager FWE
Mr. W.M. Kramer	Deputy Project Manager (Loewe) FWE

In order to grant a smooth and unhampered progress of the project the partners in the meeting have agreed upon the following measures to be taken:

1. Civil Construction and Installations within the buildings

1.1 To the opinion of FWE the space within the existing Mechanical Workshop is sufficient to also accomodate the additional machinery and equipment necessary to extend the compound for a pump repair section when integrating the existing machine pool into the pump repairing process.

1.2 Natural illumination of the Workshop building at present is insufficient as windows are not existing. In order to avoid sand and dust to enter through the doors (which are kept open for the time being to admit more daylight) FWE advices WBS an improvement by integrating into the side and gable walls of the hall rows of translucent glass bricks. These glass bricks cannot be procured locally in Somalia and would - upon approval by UNIDO - have to be supplied by FWE under the supply volume of their above contract with UNIDO. Civil works and procurement of construction material other than glass bricks will be on the side of WBS.

1.3 As well in the responsibility and at the expense of WBS will be prior to the installation of the machinery and equipment to be newly supplied
- repair of the hall floor (Where necessary)
- roof repair (some of the corrugated asbestos cement roof sheets are torn)

- foundation, channels and basins (where applicable) for machinery and equipment to be newly supplied
- installation of electric power, water and compressed air to the machinery and equipment to be newly supplied
- fencing, masonry, carpentry and joinery work within the building

according to FWE's instructions and drawings which will be given after the conclusion of the final planning and its approval thraough UNIDO. With the consent of UNIDO FWE will deliver under the supply volume of their above contract with UNIDO the necessary pipes, fittings, and instruments for compressed air supply which are not available locally in Somalia.

1.4 WBS will upgrade existing sanitary installations (toilet, washing facilities) according to European standard for the use of FWE-s technical advisor (instructor) delegated to WBS and make available to him a furnished office room of acceptable and adequate standard. Cleaning and upkeeping of the facilities will be carried out by WBS.

2. Personnel

2.1 WBS will name FWE latest 15th June 1983 the trainees who will undergo training in Germany (2 mechanics for 3 months each, 1 electrician for 4 months) and state their qualification by means of short curricula vitae. WBS willappoint one of the trainees their spokesman. WBS will inform UNIDO accordingly. The minimum qualification required of the trainees is: fair capability of the English language and knowledge in the operation of machine tools (mechanics) orelectric appliances etc. (electrician). The training at the works of FWE's technical Partner LOEWE Pumpenfabrik GmbH, Lüneburg, F.R. Germany, shall start latest between July 15th and August 1st, 1983.
On course of their duty, FWE will bear the following expenses of or make available to the trainees free of charge:
- travelling including the flight Mogadiscio - Hamburg and back on the economy class
- obtaining of permits in Germany
- lodging and boarding
- training costs
- workshop clothes
- insurance against sickness
- monthly allowance

2.2. WBS will nominate to FWE their counterpartner (workshop engineer) to FWE's advisor (instructor) latest 15th October, 1983.

2.3. WBS will assist FWE's advisor (Instructor) in his obtaining a house and house personnel during his assignment to WBS. WBS will submit to him on his arrival in Mogadiscio alternative proposals.

2.4. WBS shall install to FWE's advisor (instructor) power of instructing in every respect towards the personnel of WBS under his instructorship. However shall he not be empowered to take disciplinary action against such WBS personnel. Disciplinary power shall remain with WBS management

3. Administrative measures

3.1 WBS shall recruit personnel for the future pump repair shop (15 persons) who shall be at hand at the arrival of FWE's advisor (instructor)

3.2. WBS shall send to FWE upon their demand 3 samples of submersible pumps and one sample of centrifugal Pump (Samples of 3 different submersible pumps already at WBS' premises, sample of medium size centrifugal pump to be obtained from Jowar Sugar Factory) for training purpose and planning of test stands. The adress will be given by FWE to WBS within shart. Transportation costs will be borne by FWE from Mogadiscio to Germany.

3.3. WBS will organize the transport of repair items to and from the repair shop and will make sure that a continuous flow of repair items is guaranteed. WBS will as well procure locally available materials for the repair work.

3.4. WBS will introduce FWE's advisor (instructor) to the ministries and agencies concerned with his job.

3.5 WBS will have typewriting, copying and drawing work carried out for the FWE advisor (instructor) on course of duty free of charge.

4. Supplies

4.1. FWE will arrange with UNIDO that of the volume of supplies under their contract with UNIDO a certain sum of money may be retained until a detailed demand of tooling, fixtures, measuring instrument and spare parts has been assessed by their advisor (instructor) in reasonable time after his arrival in Mogadiscio.

4.2. As transportation of FWE-s advisor cannot be procured by WBS due to lack of vehicles in their pool, FWE shall come to an arrangement with UNIDO that out of the volume of supplies under their above contract with UNIDO a VW Microbus or similar be paid and made part of the project supplies. WBS will put this vehicle at the disposal of FWE's advisor (instructor) for his transportation during the time of his assignment to WBS. If UNIDO could allocate an additional sum for a vehicle, this would be preferred so that the substance of supply of machinery and equipment would not diminuish.

Circulation:
Ministry of Industry, Mogadiscio
Ministry of National Planning, Mogadiscio
Foundry and Mechanical Workshop, Mogadiscio
UNIDO, Vienna
UNDP, Mogadiscio
Fritz Werner Export GmbH, Wiesbaden

Annexure 5 B

MINUTES OF MEETING

UNIDO Contract 83/23, Pump Repair Shop FMW

Participants:

- Mr. Abdullahi Husein)
- Mr. Sulayman) FMW.

- Mr. Sonntag)
- Mr. Bender) FWE

Due to the fact that project progress is considerably behind schedule the following work is to be done and/or arranged by FMW immediately:-

1) Pump Test Stand

1.1 Excavation of water bassin by local contractor.

1.2 Supply of 80 Sqm. plates (40 Sheets), 5mm. thickness from FMW Stock. These 40 Sheets will be sent to Foundry by FWE.

1.3 Supply of 95 meters flat iron 100x10m to be made by FMW from Stock plates if not ready available from the local market.

1.4 Local procurement of min. 135 bags cement á Kgs. 50

2) Repair of Roof

FMW will be responsible for all damages occuring on machinery and equipment due to rain water leackage.

3) Fitting Water Supply Pipes

To the Workshop. Pipes are available in the F.W.

4) Electric Connections

To all machines and equipment already erected and installed.

Mr. Bender is directed to report accordingly to FWE that above work is progressing.

For FMW: For FWE:

3-9-84

Annexure 5 C

MINUTES OF MEETING

UNIDO CONTRACT 83/23, PUMP REPAIR SHOP FNW

Participants.

- Mr. Mohamed Ali Dahir
  General Manager FNW.
- Mr. Hans R. Sonntag)FWE.
- Mr. Bender)

Further to the minutes of meeting of 3- Sept. 84 the following plan of Work to be executed by FNW has been agreed upon:

I: a. Pump test stand - Drawing No. 4

1- Groundplate welding
2- Section 1-3 Welding
3- Concrete up to 30 cm below floor level.

Deadline: 12 Dec. 1984

b. Electric Connections

1. Two crane connections.
2. Fan for welding table
3. Installation of all sockets.
4. Preparation of mains supply for test stand

Deadline: 12 JAN. 1986

c. Working tables (Steel) - Drawing No. 2700 - 4A
cutting and Welding:

1. No. 13.1 1 Pc. 700 x 800 x 800 cm.
2. No. 8.2 & 5.3 4 Pcs. 1000 x 2000 800 cm.
3. No. 2.2 & 3.2 2 Pcs. 2000 x 1000 800 cm.
4. No. 6 1 Pc. dippainting basin 7(: 2000 x 800 cm.
5. No. 5.2 1 Pc. cleaning basin 1000 . 700 x 800 cm.

All material is available with FNW)

..2/--

Deadline: 12. Dec. 84

d. Shelves (Steel) - Drawing No. 2700 - 4A
cutting and Welding.

1. No. 9.4 1 Pc. 3000 x 1000 x 1500 cm.
1 Pc. 3500 x 1000 x 1500 cm.
2. No. 2.1 & 3.2 8 Pcs. 4000 x 500 x 2000 cm.
1 Pc. 7000 x 500 x 2000 cm.
1 Pc. 8000 x 500 x 2000 cm.

All material is available with FMW.

Deadline: 12. Dec. 84

e. Supervisor and Shop Office - Drawing No. 2700 - 4A

1. Cabin - remaining glass bricks to be used.
2. Desks - to be procured locally.
3. Filing cabinets - ditto.

Deadline: 13. Jan. 85

f. Floor Recovery

1. Removing of existing floor by 10 cm. where neccessary.
2. Filling of concrete with gravel content.
3. Finish.

Deadline: 12 jan. 85

II: Mr. Bender shall eleborate a training schedule to be followed by Mr. Abbas during his christmas Holiday leave.

Deadline: 10. Dec. 84

To attain the objectives of the project FMW shall prepare an organisation plan for a continous flow of pump repair items as per para 3.3 of minutes of meeting dd. 29. May 83.

Deadline: 12. Jan 85

FWE shall continue the negotiations with UNIDO concerning an extension of Mr. Bender's stay after termination of his contractual services on 28. Feb. 1985

..3/--

Due to the fact that the visit of a UNIDO and FRG Government delegation has been announced to start on 14. Jan.1985 FMW shall take all necessary measures and actions to present the project accordingly.

For FMW

For FWE

Date: 28/11/1984

ANNEXURE 6

5.2.4 Necessary additional machinery and equipment for pump repair

5.2.4.1 Supplies for Rehabilitation of existing Equipment

In consequence of the findings described under sections 5.2.3.1 and 5.2.3.2 one major item of supplies will necessarily have to be a stock of spares, tools, fixtures and auxiliary materials essential to put the already existing equipment into reasonable working order. An inventory at site has to forego ordering and delivery.

5.2.4.2 Additional Equipment

The requirementof additional equipment necessary for the pump repair shop is given hereafter:

Supervisor's and shop office

- glassed cabin, lockable
- desks and chairs
- filing cabinets, abt. 1 m height
  (all local supplies)

Spare parts store, tool shop

- fencing, lockable doors
- working tables
- shelves
  (to be produced in the workshop according to drawings supplied or local supplies)

Reception of repairworthy pumps

- pallets (to be produced in the workshop/pattern shop)

Diagnosis, dismantling and cleaning, painting

- swivelling column hoist
  1000 kp/3 m
- cleaning basin
  (to be produced in the workshop)
- working tables
  (local supplies)
- whirling beam sand
  blast chamber
- dip painting basin
  (to be produced in the workshop
  according to drawings supplied)

Motor repair

- mobile working table
- lockable cabinet

Pump re-assembly

- swivelling column hoist
  1000 kp/3m
- working tables
  (local supplies)
- spindle press (manual)
  40 t

Testing department

- Universal pump test stand for
  submersible electric and shaft

driven pumps and centrifugal pumps
including motor test field and
swivelling column hoist 1000 kp/2,5 m
(test basin and shelves to be produced in the workshop according to drawings supplied)

Grinding

- (It might be that a further grinding machine has to be added to this section. This can be decided and specified only after detailed inventory on the existing universal tool grinder, its accessories and usability)

Welding

- welding table
  (to be produced in the workshop according to drawings supplied)
- welding transformer with accessories
- belt grinding machine
- gas welding and cutting equipment including gas and oxygen cylinders without filling
  (filling local supplies)

Tool and fixture making

- marking table with accessories
- column drilling machine 30 mm

Smithy

- swage block
- straightening plate
- forge fire
- anvil
- double wheel stand

Miscellanous fixtures

- metal powder spraying equipment
- V-belt joiner
- gasket cutter
- extracting devices
- special vices for pump shafts

Transport and Storage Equipment

- storage bins, scrap bins
  (to be produced in the workshop)
- 8 lockable tool cabinets
- 3 pallet trucks 2 t capacity

Electric Hand tools

- 2 hand drilling machines
- 1 parting-off grinder
- 1 soldering set
- 1 flexible shaft grinder

Mechanics' and Electricians'
Outfit, Hand tools, tool outfit
for new machines

- 8 workbenches with vice

- machine and hand cutting tools, taps and dies, spanners, screw drivers, hammers, wrenches, pliers, files and chisels, auxiliary materials, measuring instruments

ANNEXURE 7

UNIDO CONTRACT No. 83/23
Foundry and Mechanical Workshop
Mogadiscio / Somalia

Annexure 7 A
to Consdid.
Final Report

Programme of Training for Somalian Personnel at Messrs. Loewe Pumpenfabrik GmbH, Lüneburg, Germany

The training is divided into 2 main phases.

Phase No. I provides for a general basic formation of 1 month in Messrs. Loewe's vocational training shop. The basic programme will be shared by all 3 trainees and will mediate the following manual skills:

Exercise No. 1 — Lengthening of sheet metal

a) marking-out by means of ruler and mark scraper
b) lengthening of flat-bar steel
c) stencil measuring — 6 hours

Exercise No. 2 — Processing of sheet metal

a) marking-out by means of angle measuring instrument and mark scraper
b) chiseling of sheet metal according to marking-out — 3 hours

Exercise No. 3 — Filing and drilling of sheet metal

a) marking-out and center punching
b) smooth filing of sheet metal
c) drilling (hand and column drilling machine)
d) simple measuring with sliding caliper — 5 hours

Exercise No. 4	Bending of wire and sheet metal	
	a) bending of round bars and sheet metal	5 hours
Exercise No. 5	Sheet metal cutting	
	a) marking out	
	b) cutting by means of plate shears according to marks	
	c) straightening with mallet	6 hours
Exercise No. 6	Bending of thin sheet metal	
	a) tangent bending by means of hatchet stake and mallet	5 hours
Exercise No. 7	Sawing according to marks	
	a) sawing with hack saw	3 hours
Exercise No. 8	Filing true to size	
	a) rough and smooth filing	
	b) checking of angularity and planeness	
	c) narrow tolerance measuring with sliding caliper	8 hours
Exercise No. 9	Filing of round pivots	
	a) rough and smooth filing	3 hours

Exercise No. 10	Filing of chamfers, roundings and angles	
	a) use of saw sharpening vice, mitre square and rounding stencil, measuring with sliding level	12 hours
Exercise No. 11	Drilling and threading	
	a) drilling of blind and through holes	
	b) manual threading	
	c) inside and depth measuring	6 hours
Exercise No. 12	External threading	
	a) die cutting	
	b) measuring with ring thread gauge	4 hours
Exercise No. 13	Assembling of parts	
	a) hand reaming	
	b) pressing of straight pins	6 hours
Exercise No. 14	Upsetting of a sqaure head	
	a) fire requirements	
	b) upsetting	
	c) forging of the square	
	d) straightening	4 hours
Exercise No. 15	Stretching of a wedge	
	a) stretching	
	b) hewing	4 hours

In addition to the above mechanical formation a training in the operation of machine tools as follows will be given in phase No. I:

Turning	32 hours
Milling	24 hours
Shaping	16 hours
Drilling	8 hours

Following the basic formation a special pump repair training of 2 months is rendered. For the electrician it will focus on the electrical components of pumps, in particular motors, for the two mechanics the keypoint will lie on mechanical components. However, it is considered appropriate to give the electrician also a good knowledge of mechanical pump functions and vice versa to give the mechanics, a good background of electrotechnique.

Steps of the special training are as follows:

1. Dismantling of pumps

   Submersible pumps,
   Centrifugal pumps
   motors

2. Diagnosis

   Measuring of dismantled parts,
   evaluation of reuseability of parts

3. Determination of repair

   repair procedure, necessary spare parts

4. Report of findings

5 Production of parts

5.1 mediation of shaft production know-how

5.2 mediation of production know-how for other components

5.3 visit of a foundry

6. Cleaning and repair of dismantled parts

mediation of procedures

7. Pump assembly

re-assembling of dismantled pumps

8. Pump testing

individual test stands within the repair section, central test stand

9. Rehearsal and training

of activities,
assistance in pump production
targeting self-acting performance

At the end of phase No. II a training of approx. 1 month will be given to the electrician on the following fields:

a) Repair of electric motors
b) Assistance in construction and assembly of pump plants
c) Plant cabling
d) Plant piping
e) Functional testing
f) Assembly of switch boards (cabling)

UNIDO CONTRACT No. 83/23
Foundry and Mechanical Workshop
Mogadishu/Somalia

Annexure 7 B
to Consdid.
Final Report

Revised Training Programme

1. First Training Month (August 1983)

The training (mediation of general mechanical skills in metal morking), given to all 3 of the group commonly had the content as originally scheduled. It took place at the vocational training shop of Messrs. Loewe Pumpenfabrik.

2. Second Training Month (September 1983)

The training in September 1983 was held mainly in the repair section and the test field of Messrs. Loewe Pumpenfabrik.
A differentiation was made between mechanical and electrical instruction as far as communication problems did not object the target.
The times spend by the trainees on the various activities are broken down hereafter:

Type of work	Mr. Abdulkadir Jama Abas hours	Mr. Mohamud Ahmed Togan hours	Mr. Mohamed Hussen Hassan hours
Dismantling and cleaning High pressure pumps/motors Centrifugal pumps/motors Submersible pumps/motors piston pumps/ motors	60	72	80
Assembling High pressure pumps/motors Centrifugal pumps/motors Submersible pumps/motors Piston pumps/ motors	40	-	52
Lathe and machine tool works Impellers, interconnecting parts, reworked shafts (incl. metal spraying)	32	60	-
Theoretical training	44	44	44
	176	176	176

3. Third Training Month (October 1983)

The training focussed on electrotechnique, in particular with Mr. Mohamed Hussen Hassan who spend all his time on this formation. Centrepoints were laid on the following fields in theory and practice:

a) Bases of Electrotechnics:
Current - tension - resistance - DC - AC single and three phase - wiring of AC supply lines

b) Practical installation exercises:
On/off switching (light) - connecting of grounded outlets - joining-up of a 3 phase AC motor via pushbutton switch and protective motor switch - connecting of a 5 pole socket - joining-up of a 3 phase AC motor via contactor and over-current trip

c) Measuring of current, tension and resistance of various circuits - construction principles of 3 phase AC motors and windings - fault detection by means of current and resistance measuring - bridging of terminals, relation between feeding voltage and design of motor winding (star-delta connection) - structure of protective motor trips and overcurrent trips

d) Practical connection exercises on the circuit plug board to wiring diagram:

- fluorescent lamps - 3 phase AC motor

via contactor and protective motor switch - contactor via double push button - reversing contactor via triple push button.

A breakdown of time is given hereunder:

Type of work	Mr.Abdulkadir Jama Abas hours	Mr.Mohamud Ahmed Togan hours	Mr.Mohamed Hussen Hassan hours
Dismantling and cleaning High pressure pumps Centrifugal pumps Submersible pumps Piston pumps	24	48	-
Assembling High pressure pumps Centrifugal pumps Submersible pumps Piston pumps	24	-	-
Electrotechnics Theoretical and practical exercises	120	120	160
Sickness			8
	168	168	168

Training of Mr. Mohamed Hussen Hassan and Mr. Mohamud Ahmed Togan ended after the month of October 1983.

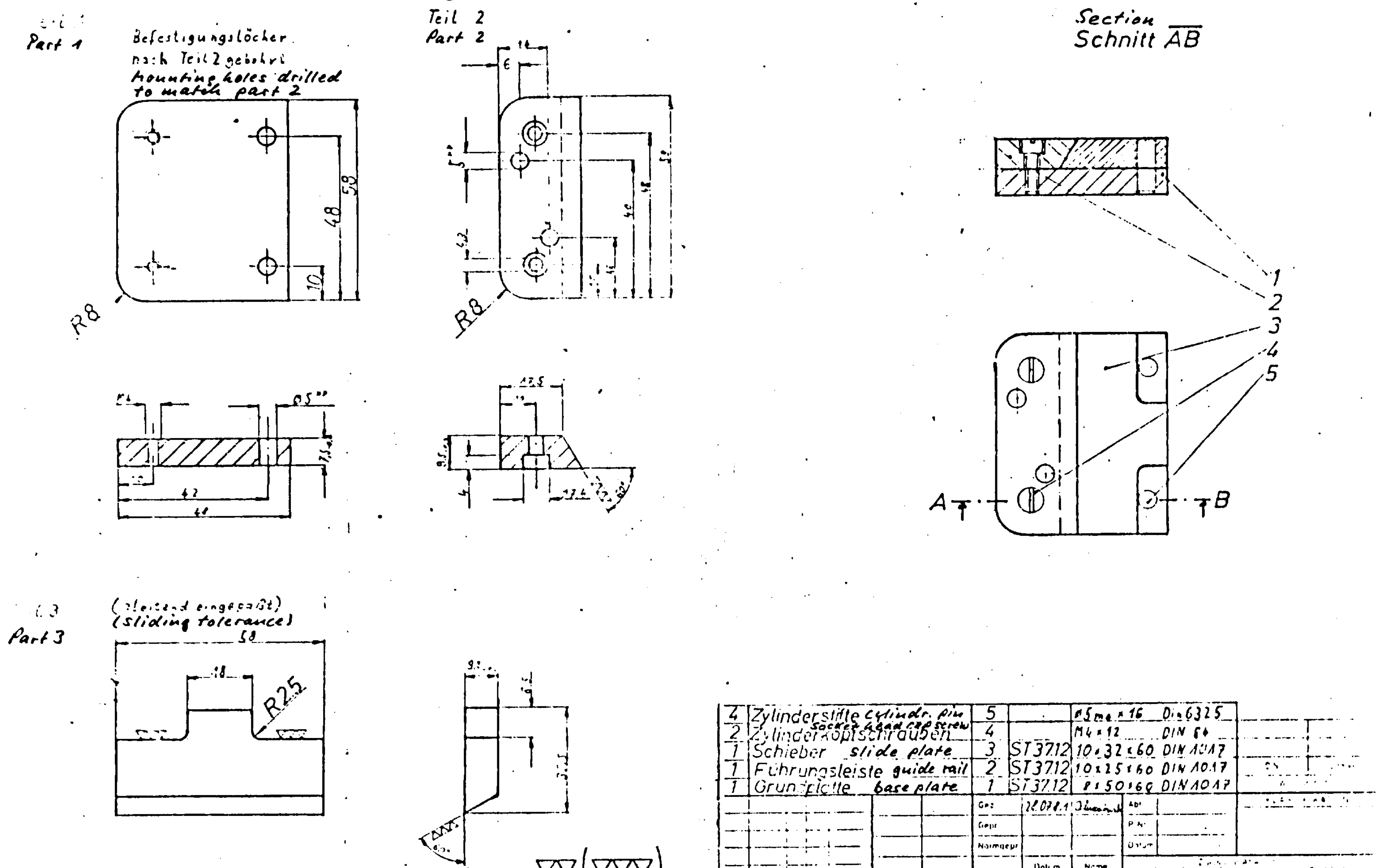
4. Forth Training Month (November 1983)

Training was rendered to Mr. Abdulkadir Jama Abas only. It concentrated on rehearsal of the lessons given on mechanics in the precedent months, his attention not being deviated by interpretatory tasks. A time split-up of his activities is given hereafter:

Type of work	hours
Dismantling and Cleaning	
High pressure pumps Centrifugal pumps Submersible pumps Piston pumps	40
Assembling	
High pressure pumps Centrifugal pumps Submersible pumps Piston pumps	100
Testing	
High pressure pumps Centrifugal pumps Submersible pumps Piston pumps	20
	160

5. Practical Tests

The first training month in the vocational training shop of Messrs. Loewe ended with the successful manufacture of a test piece according to the enclosed drawing attached hereafter by all 3 of the group.



4	Zylinderstifte *cylindr. pin*	5		Ø5m6 × 16	DIN 6325
2	Zylinderkopfschrauben *socket head cap screw*	4		M4 × 12	DIN 84
1	Schieber *slide plate*	3	ST37.12	10 × 32 × 60	DIN 1017
1	Führungsleiste *guide rail*	2	ST37.12	10 × 25 × 60	DIN 1017
1	Grundplatte *base plate*	1	ST37.12	8 × 50 × 60	DIN 1017

LOEWE PUMPENFABRIK GMBH — Übungsstück *Test piece*

Individual Judgment on the Trainees and Proposal for their further functions at FMW

1. Individual Judgement on Trainees

1.1 Mr. Abdulkadir Jama Abas

1.1.1 Mr. Abas' vocational background as a mechanic and machine operator has been helpful in the performance of the training. It can be stated that Mr. Abas approached and executed the tasks he was set with a feeling of self-certainty and routine. His great interest and diligence, in combination with his power of comprehension have improved the results of his work steadily and thus made his instruction successful. No doubt have his long practical experience and his good capability of the English language contributed to the good effect.

1.1.2 An appraisal of his vocational skills in main fields results in the following marks as an average over the time of his training

- Dismantling and cleaning diagnosing of pumps and motors	2 to 3
- Assembling of pumps and motors	2 to 3
- Testing of pumps	3
- General mechanic and machine tool work	2
- Electrical connecting and installation works	3

1.1.3 A judgment of performance produces the marks as hereafter:

- Power of comprehension 2 to 3
- Execution of works 2
- Steadiness and interest 2 to 3

1.2 Mr. Mohamed Hussen Hassan

1.2.1 Mr. Hassan before has worked mostly as a welder and due to this and his younger age, his professional background and experience has been somewhat minor. It can be stated that he worked hard to step up with the target of the training showing diligence, interest and intellectual grasp.
Mr. Hassans' understanding of the English language, however, was not sufficient to give him a very distinct training on electro-technique as originally intended but necessitated to instruct him more or less in this particular field within the group of trainees.

1.2.2 His vocational skills are appraised by the following marks:

- Dismantling and cleaning, diagnosing of pumps and motors 4

- Assembling of pumps and motors 3

- Electrical connecting and installation works 4

- General mechanic work 3 to 4

1.2.3 Performance marks given

- Power of comprehension	3 to 4
- Execution of works	3
- Steadiness and interest	3

1.3 Mr. Mohamud Ahmed Togan

1.3.1 Being the youngest group member, Mr. Togan had some problems in the begin with tasks unknown to him before. However, he adapted himself smoothly into the job and showed lively interest, ambition and technical grasp. His lack of understanding English made the result of his instruction a little worse than it could have been with sufficient knowledge of English.

1.3.2 Judging on his vocational skills delivers the marks hereafter:

- Dismantling and cleaning, diagnosing of pumps and motors	4
- General mechanic and machine tool work	3
- Electrical connecting and installation works	4

1.3.3 Performance marks

- Power of comprehesion	3 to 4
- Execution of works	3
- Steadiness and intensity	3

1.4 System of Marks

Marks were given to the following scale:

1 : excellent
2 : good / above average
3 : average
4 : fair
5 : unsatisfactory
6 : failure

2. Proposals for the further Functions of the Trainees at FMW

Future employment of the gentlemen in the pump repair shop is recommended as follows:

1.2.1 Mr. Abdulkadir Jama Abas

His vocational background and excellent power of comprehension as well as the longer stay with Messrs. Loewe Pumpenfabrik has allowed for a comprehensive instruction and briefing on the various jobs within pumps repairing. He can be seen as the foreman of the pump department.

1.2.2 Mr. Mohamed Hussen Hassan

His training had the focus on electrotechnique in which he spent the entire third month of his training. The job he should be entrusted with is the in-charge of Pump motor reconditioning and pump re-assembling.

1.2.3 Mr. Mohamud Ahmed Togan

He showed great interest and skill in pump dismantling and machine tool work. He should be made in-charge of these jobs.

CERTIFICATE OF TRAINING

This is to certify that: MR. ABDULKADIR JAMA ABAS

of the Foundry and Mechanical Workshop, Mogadiscio/ Somalia has been given technical training in pump repair and maintenance at the works of Loewe Pumpenfabrik GmbH., Lüneburg / Federal Republic of Germany, from 1st August to 30th November, 1983.

On course of training he has been familiarized in theory and practice with

General mechanics and metalworking
Operation of machine tools
Measuring methods
Dismantling, cleaning, assembling of pumps
Functional testing of pumps
Manufacture of pump spare parts
Electrotechnics in structure
and function of motors, joining-up
of motors and armatures, fusing,
construction of switchboards

The professional background and intelligence of Mr. Abas, together with his good capability of the English language, as well as his active collaboration and overall attention have made his training a pleasure for his instructors. The knowledge he has gained will enable him to hold a key function in the Pump Repair Section of the Foundry and Mechanical Workshop.

Fritz Werner Export GmbH, Wiesbaden

30th November, 1983

Geschäftsführung

CERTIFICATE OF TRAINING

This is to certify that: MR. MOHAMED HUSSEN HUSSAN

of the Foundry and Mechanical Workshop, Mogadiscio / Somalia has been given technical training in pump repair and maintenance at the works of Loewe Pumpenfabrik GmbH., Lüneburg / Federal Republic of Germany, from 1st August to 31st October, 1983.

On course of training he has been familiarized in theory and practice with

General mechanics and metalworking
Operation of machine tools
Measuring methods
Dismantling, cleaning, assembling of pumps
Functional testing of pumps
Manufacture of pump spare parts
Electrotechnics in structure
and function of motors, joining-up
of motors and armatures, fusing,
construction of switchboard

Mr. Mohamed Hussen Hussan has shown great interest and diligence and a good intellectual grasp during his training which will enable him to contribute to the success of the Pump Repair Shop of the Foundry and Mechanical Workshop.

Fritz Werner Export GmbH, Wiesbaden

31st October, 1983

Geschäftsführung

CERTIFICATE OF TRAINING

This is to certify that: MR. MOHAMUD AHMED TOGAN

of the Foundry and Mechanical Workshop, Mogadiscio / Somalia has been given technical training in pump repair and maintenance at the works of Loewe Pumpenfabrik GmbH., Lüneburg / Federal Republic of Germany, from 1st August to 31st October, 1983.

On course of training he has been familiarized in theory and practice with

General mechanics and metalworking
Operation of machine tools
Measuring methods
Dismantling, cleaning, assembling of pumps
Functional testing of pumps
Manufacture of pump spare parts
Electrotechnics in structure
and function of motors, joining-up
of motors and armatures, fusing,
construction of switchboard

Mr. Mohamud Ahmed Togan has shown great interest and diligence and a good intellectual grasp during his training which will enable him to contribute to the success of the Pump Repair Shop of the Foundry and Mechanical Workshop.

Fritz Werner Export GmbH, Wiesbaden

31st October, 1983

Geschäftsführung