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„INVEST - IMPORT“ Beograd, Yugoslavia
SOUR LIVNICA ŽELJEZA I TEMPERA „KIKINDA“
RO „PROGRES“ Kikinda, Yugoslavia

FOUNDRY AND MECHANICAL WORKSHOP PROJECT AT MWANZA, TANZANIA

FINAL REPORT

September, 1987.

"INVEST - IMPORT" Beograd, Yugoslavia
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INTRODUCTION

This Final Report covers all activities performed in the period before the signature date (UNIDO award cable dated 8th January, 1981) till the completion of installation work and "Cold tests".

The aim of the Project and Contract was to establish and start operating in the project area a foundry with an integrated mechanical workshop of an annual capacity of 1ooo to 13oo tons of ferrous and non-ferrous castings.

The establishment of a plant was based on a contribution from the Yugoslav Government related to equipment, engineering design, training, supervision, etc., as declared during the Solidarity Meeting in Arusha in July 1979. As proposed and accepted at the Solidarity Meeting, the project was implemented jointly by the United Republic of Tanzania, Yugoslavia and UNIDO with the coverage of local, Yugoslav and convertible currency requirements from the three sources respectively. The plant was located in Mwanza, as it was agreed particularly to assist further industrialization and agriculture development of this region.

The Small Industries Development Organization (SIDO) from Tanzania and Invest-Import from Yugoslavia were nominated as Governments Agencies responsible for the implementation of the project.

The Contract between UNIDO and Invest-Import for the development, design and provision of machinery and equipment was signed on 16 th June, 1982.

The estimated period for establishment of Foundry with Integrated Mechanical Work shop was about 2,5 years.

However, the start of implementation of Foundry has been delayed for about 2,5 years (as per Enclosure No. 1: implementation bar-chart).

The main reason for such a long delay was the shortage of funds allocated to this project: the civil engineering works have been delayed for about 2,5 yeras. The project was, therefore, revised and rescheduled by the Tripartite Meeting held in Dar es Salaam on 28 th February, 1983 (as per Enclosure No.2.: The Report on the Tripartite Review Meeting).

Due to the high cost of building and the longer time envisaged if civil construction was to develop the alloted site and infrastructure, SIDO in collaboration with Mwanza Farmers Corporation devised ways of implementing the project in the existing Godown.
This Godown was suitable for the use of a Foundry and Mechanical workshop. But, it was necessary to modify and adapt the overall design documentation to the size and shape of the existing building, as well as, to the new requirements of industrial infrastructure at project site, i.e.:

- technological and engineering design,
- assembly documentation,
- energy and utilities design along with specification of installation materials,
- new drawings for laboratory and mechanical workshop,
- design for compressor station and raw material boxes etc.

In accordance with the above, additional activities and works at the site have been necessary to be completed prior to the installation of equipment as to be adjusted to the adopted building size, i.e.:

- redesigning and reconstruction of supporting columns, platforms, conveyers, dust collector pipeline systems, cupolas, chimney, skip, monorails etc.

Leaving the equipment in the stores for a long time (over 2 years) required much more time and work for the checking, cleaning, repair and change of damaged parts of equipment.

The increased numbers of travelling (21 instead contracted 12) and staying on site were necessary for choosing the location, checking the building and foundations, analyses of the possibilities of local supply of necessary raw material, tools and power.

Many days were wasted by Yugoslav experts waiting for flights to Mwanza due to lack of aircrafts, fuel and repair of runway.

Installation works were often done on Sundays, holidays and in over times, because the mobile crane could be found only then. Many works have been done without using mobile crane on the risk of accidents.

Because of the shortage of building material (cement, steel reinforcements, etc.) civil construction works showed slow progress, although the supply of these materials had the priority in Tanzania for the site needs. Many civil construction works have been done along with installation works.

The same situation was with electrical materials and works and with material for compressed air pipeline.

The problem of providing the liquid oxygen and welding gas had been always present.

Bad weather conditions can be added to this, especially that of 12th November 1985. in Mwanza, when the hall was completely flooded. All components, mainly electrical motors and reduction gears, one repaired, recondioned and lubricated, ready for erection, had to be repaired again.

The installation works started on 14th August 1985 and were successfuly completed (included "cold tests" of installed machinery) on 21/22 July 1986 (as per Enclosure No. 3.: Hand-over Certificate with Attachments 1. and 2., Mwanza 22/07/86.)

All the above facts clearly indicate why more man/months were spent for project implementation.

The comparison o contracted and really spent man/months is given in the Enclosure No. 4.

Due to lack of necessary items at Tanzanian market, a great portion of materials, tools and parts have been procured (out of subcontract) by Yugoslav partner during installation (as per Enclosure No.5.: List of materials which is procured out of the subcontract).

Despite all difficulties, the installation work was completed successfully, with the exception of complementary equipment (moulding machines and laboratory items) which were ordered in August 1987. (Contractual obligation of UNIDO).

The training of 14 participants from Tanzania in the production plants in LŽT "Kikinda" in Kikinda was successful. After one-month of theoretical training, all participants were assigned to appropriate work places, and took part in the process of normal-commercial production. Most of the trainees possessed comprehensive knowledge in occupational skills, even before the training started.

As the implementation term of Contract expired in April 1984 (revised term), and Yugoslav side filled out all contracted obligations, there was no more responsibility for project completion for Yugoslav subcontractor.

Recommendation:

In order to put the plant into operation, the following was recommended:

1. To deliver to the site the minimum complementary equipment, especially two pairs of moulding machines (as per Enclosure No. 6.)
2. To install moulding machines and check up all units and items of installed equipment, because of too long staying of the same on site (more than one year).
3. To ship to the site rest of raw material for start-up production (as per Enclosure No.7: raw material for star-up production).

4. To provide locally available material (as per Enclosure No. 8: List of locally available material for start-up production).

5. To produce foundry tools (patterns, core boxes etc.) in time for the defined production programme. It is possible to manufacture good quality of foundry tools in Tanzania (tool factory "Cotex" - close to Dar es Salaam).

6. To provide funds in total amount of about 2oo.ooo US$ for start-up production.

7. To provide funds in total amount of 122.329,oo US$ for covering of extra work implemented but not contracted (as per Enclosure No.9.)

ANNEX 1

TERMS OF REFERENCE

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for assisting the Tanzanian Small Industries Development Organization (SIDO) in setting up a Foundry and Mechanical Workshop (FMw) at Mwanza, Tanzania

I. Introduction

The idea of establishing a foundry plant with integrated mechanical shop was originally discussed upon the request of the Government of Tanzania during the Solidarity Meeting held in Arusha on 23 to 26 July 1979. As stated by the Government the industrial sector of the country is regarded as one of the major movers of the economy planned to be developed rapidly in order to create stronger economic interlinkages with agriculture, rural infrastructure, food processing industry and other related branches of the economy.

The industrial activities planned for implementation in the iron and steel and engineering industries include among others the production of basic metal products and castings, the latter ones considered necessary for inter alia the assembly of various types of water pumps for new irrigation projects which are recognized by the Government as one of the top priority affecting the long term strategy of agriculture development.

During the discussion carried out on the Solidarity Meeting the Government of Yugoslavia offered a donation of design and equipment for a Foundry - Mechanical Workshop Project.

As proposed and accepted on the Solidarity Meeting the Project is to be implemented jointly by the United Republic of Tanzania, Yugoslavia and UNIDO with the coverage of local, Yugoslavia and convertible currency requirements from the three sources respectively.

A feasibility study on the establishment of a foundry with Mechanical workshop for the production of special purpose castings made partly of modified alloys and accessories for water pumps and other industrial products was carried out by a Yugoslav Consulting Office "MASINOPROJEKT" in 1979.

The study identified the demand for cast products classified as follows:

- casting for water pumps and spare parts,
- electromotor spare parts,
- spare parts for textile, sugar, cement and other industries,
- grey cast iron fittings and valves,
- cast elements for railway equipment,
- cast parts of sanitary and sewage system.

Based on the Project Document approved by all the concerned parties and the contract concluded between the Yugoslav "INVEST-IMPORT" and the Tanzania "SIDO" the Project becomes now operational for its further implementation.

II. General duties of the subcontractor

1. Detailed technological and engineering design
2. Detailed planning and programming of the Project implementation.
3. Provision of technical personnel for direct assisting and supervising the projected works in the Project Site.
4. Procurement of complementary equipment.
5. Shipment of the equipment and machinery *
6. Supervision of installation works.
7. Preparation of complete technical documentations for demonstration final products selected by SIDO.
8. Running and performance tests of installed machinery and equipment.

III. Scope of contracted works

1. The duties of the Contractor, within the general requirements of the Project will be as follows:

   a) Submit a general description of the shops, their functions, scope of work and products.

   b) Elaborate a detailed plant layouts for the shops, including all necessary drawings, plant layouts in scale 1:50 shall be be elaborated to include all individual items of equipment, together with their respective energy and utility requirements, taking into account the conditions at the plant site and other local conditions and requirements for the operation of the shops.

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* Obligatory to the equipment contributed by the Yugoslav Government and complementary equipment agreed within this subcontract. (CIF Dar-es-Salaam).

c) Complete date for civil engineering design (buildings and utilities network electricity, water, communications, compressed air, drainage system, etc). To enable SIDO to provide that civil engineering design in Tanzania.

d) Complete instructions for the operation of the equipment and of the shops as a whole, including detailed specifications with annual quantities for the raw materials required, and quantitative flow-sheets for both shops.

2. Detailed planning and programming of the project implementation

Based on the detailed technical documentation especially on the engineering design, specification of the equipment, complete data for civil engineering design, lay out, sketches, tables, etc. the sub-contractor is obliged to provide:

(a) All the necessary instructions and explanations needed for the execution of the project, including a chart showing what work in what sequence is to be carried out until the complete erection of the Foundry and Mechanical Workshop.

(b) A detailed work-plan indicating time and dates required, all based on the time schedule given in the project document.

(c) Complete instructions for the operation of the equipment and of the shops as a whole, including specifications of annual quantities for the raw materials required, and quantitative flow-sheets for both shops, i.e. the Foundry and the Mechanical Workshop.

(d) Process flow diagrams.

(e) Personnel requirements, particularly:

(i) Manning table covering local personnel needed for normal operations. The table should indicate the subsequent periods of personnel assignments, qualification required and scope of duties complemented by relevant draft job descriptions,

(ii) Details of subcontractor staff with time - periods to assist in the erection, installation and initial operations of the FMW - Mwanza,

(iii) Details on skilled and unskilled local labour for the installation of the equipment.

3. Provision of technical personnel for direct assisting and supervising the projected works in the project site

(a) The subcontractor will be obliged to select and appoint highly qualified personnel in accordance with the established UNIDO rules and regulations and the requirements given in the Project Document.

(b) Specifically the provision of the following field experts and specialists will be required:

- Project Coordinator
- Foundry expert
- Industrial designers in civil engineering and energy for the review and verification of SIDO design documentation
- Experts in industrial installations related to energy and power lines, building erection and contruction works
- Expert in foundry erection
- Expert in mechanical shop erection

(c) The subcontractor is obliged to secure a proper continuity of technical services through the minimum duration of stay of the personnel in the project area assumed as follows:

- Project coordinator/team leader	(1)	11 months
- Foundry expert	(1)	11 months
- Industrial designers	(2)	4 months
- Experts in industrial installations	(2)	5 months
- Foundry erection expert	(1)	5 months
- Expert in mechanical shop erection	(1)	2 months
Total	(8)	38 months

(d) All the draft documents and forms related to the Project Personnel have to be prepared and submitted to UNIDO for approval. This particularly applies to:

- detailed manning table
- personal history statements (UNIDO standard form) of personnel
- job descriptions.

(e) All the costs related to transportation, boarding, insurance, medical treatment and other not specified in this document will be entirely borne by the subcontractor. (Note: as per a separate agreement the accomodation and transportation - daily routine transport - in Mwanza, is to be provided by the Government

4. Procurement of complementary equipment

(a) The subcontractor is expected to procure the following complementary equipment suitable for the machinery projected for the FM.

(i) Liquid Iron Distribution

- pouring monorail - 1 set
- pouring ladles - 3 sets

(ii) Sand Preparation and Core shop

- two conveyour belts of 37 m each for mould sand transportation,
- three conveyor belts of 49 m each for return sand transportation,
- magnetic separator - 1 pc
- additive and new sand hoist with separator - 1 pc

(iii) Chemical analysis section

- equipment, glasses, accessories
- apparatuses

(iv) Moulding section

- roller conveyors 84 m
- shake-out grid - 1 pc

(v) Transportation section

- Hydraulic diesel fork lift truck capacity 2 tons 2 pcs

(vi) Cleanign shop

- Hand pneumatic grinders - 10 pcs
- balance-weight capacity 1 ton - 1 pc

(vii) Metal sample preparation

- machinery equipment (drilling, grinding machinery)
- tools and accessories

(b) The subcontractor is obliged to include into the offer tech specifications of the complementary equipment and its FCB an (Dar-es-Salaam) prices respectively.

5. Shipment of the equipment and machinery

(a) The equipment which shall be delivered to Dar-es-Salaam will conform to the specification lists prepared by the producer. No modifications to the list will be permitted, or additions made or items deleted without the expressed approval in writting by UNIDO and earlier consultations with the SIDO and UNIDO Project Backstopping Section.

(b) The subcontractor will arrange for the shipment of all equipment from the manufacturers until it is placed on the ground within the bounds of the sea port in Dar-es-Salaam. The subcontractor must arrange for such insurance if it has not been included in the total purchase price of the equipment.

(c) The subcontractor will specify in writing to the SIDO the assistance required with regard to the import documents at least 45 days before the arrival of the first shipment to the port or border. Copies of the correspondence should be informatively sent to UNIDO and the UNDP in Dar-es-Salaam.

(d) Information concerning shipping weights, crate dimensions, etc. will be supplied by the subcontractor as soon as they are available. The subcontractor undertakes to inform SIDO and UNIDO of any limitati which may be applied to weight or measurements of the crates.

6. Supervising of installation works

(a) The expression "installation" within the text of this para is used as a general term referring to any work, activity or arrangement necessary to put any machinery and equipment into full operational and functional condition.

(b) The subcontractor is expected to supervise all the installation works related to the equipment and machinery provided for the Project, their proper assembly, foundation and connection to the required network of energy.

(c) The subcontractor will test each item of the equipment before beginning production, and will report on any and all of the adjustments necessary to ensure that all the equipment is in good working order.

(d) The subcontracor will carry out technological trials and performance test intiating the operation of the FMW and will continue to operate the plant for a period of 6 months beginning after the date when all the equipment has been shown to be installed and to be fully operational. The subcontractor will determine whether or not each item complies with the specifications provided by the manufacturer in all respects, but with special attention to capacity and production rate, and will so inform UNIDO and project authorities The subcontractor will be obliged to submit to UNIDO and SIDO relevant reports on results of the testing.

(e) The subcontractor is expected to closely collaborate with and assist SIDO Autohorities and the project management in proper selecting of raw materials required for technological trials and performance tests.

(f) Based on the list of needed materials and installation accessories provided by the supplier of the equipment the subcontractor is also obliged to examine qualitatively and quantitavely the state of supply stored in the project site and its conformity with the technical specification and recommended standards.

7. Preparation of complete technical documentation for demonstration final products

(a) This para refers to specimens of the final products to be selected by the SIDO such as water pumps, grey iron, fittings, engineering spare parts or other /elements and/ or parts recommended by the Yugoslav "MASINOPROJEKT" to be included into the production programme.

(b) The subcontractor will advise the SIDO on the selection of products in respect of the technical suitability for the manufacturing in the foundry and mechanical workshop.

(c) The subcontractor is obliged to collect from the SIDO the complete technical data of the selected products and to obtain information on the actual demand of such products in order to elaborate most appropriate technologies for the manufacturing processes.

(d) The subcontractor will be obliged to prepare complete engineering drawings of the products and to identify the materials used in the manufacturing processes.

(e) After the selection of final products the subcontractor is also expected to prepare :

- drawings and sketches related to patterns, tools, auxiliary elements like core boxes, pates, etc. whatever required to undertake a regular production,
- technological and operational instructions along with specifications of raw materials needed,
- quality control requirements and testing procedures.

8. Running and performance tests of installed machinery

(a) the subcontractor shall carry out all necessary running and performance tests of the equipment and machinery installed in the foundry and mechanical workshop.

(b) the tests will be undertaken in close collaboration with and at th presence of counterpart staff appointed by SIDO Authorities.

(c) results of the tests will be registered in specially designed cards/ sheets provided by the subcontractor respectively for each machine or equipment and compared with the projected capacity given by the producers.

(d) detailed schedule of testing will be early agreed by the subcontractor with the counterpart staff also with regard to the requirement of raw materials and tools needed for test runs.

(e) the period of testing should be fully utilized for checking the proper installation, electrical and other connections of machinery and its conformity with the projected capacity.

XV. Miscellaneous obligations

(a) The subcontractor is obliged to submit quarterly to UNIDO and to SIDO progress reports (in five copies) concerning the actual status of contract execution, along with conclusions and recommendations. The draft final report - also in five copies - will be submitted 60 days before the completion of all the contracted works.

(b) All the documents prepared by the contractor i.e. the reports, technical and operational instructions, description of drawings, technical documentations, etc. are required to be written in English. The same - whenever required - apply to the marks, signs, danger notices (labels), switchboards, atc. to be located on the equipment and machinery during the installation and commissioning.

(c) The subcontractor is obliged to submit to the SIDO till the end of two months after awarding the contract a list or a specification of al individual parts or accessories needed for the installation of the equipment which may be fabricated by local manufacturers upon consultation with all the concerned parties.

(d) The person appointed and authorised by the contractor to coordinate all the works and activities related to the execution of this subcontract will be requested for briefing, intermediate and debriefing sessions envisaged for 2 - 3 days each in Vienna or in Dar-es-Salaa

The Sessions will be organized:

1. After awarding the subcontract
2. After submitting the work plan for overall contract execution
3. After submitting the draft final report i.e. 60 days prior the completion of all the contracted works.

(e) The cost of travels, lodgings, etc. connected with the scheduled sessions will be entirely borne by the subcontractor.

(f) The subcontractor is obliged to make available for the UNIDO H, copies of correspondence and communications between his office, SIDO and the project authorities in Tanzania.

10. Timing

(a) Schedule of contracted activity/operation

		Consecutive month after awarding the contract	Deadline
1.	Awarding the contract	0	Dec. 81
2.	Planning and scheduling of process documentation	1	Jan. 82
3.	Specification of raw materials and labour standards	1	Jan. 82
4.	Tender documentation for equipment procurement	1	Jan. 82
5.	Documentation of work methods	1	Jan. 82
6.	Detailed technological and engineering design	2	Feb. 82.
7.	Procurement and contracting of equipment and machinery	2	Feb. 82
8.	Review and verification of SIDO documentation of civil engineering design		
	- preliminary	4	April 82
	- final	16	April 83
9.	Technical documentation for assembly and installation of the equipment	9	Sept. 82
10.	Shipment of equipment		
	- first lot	8	Aug. 82
	- final lot	12	Dec. 82
11.	Supervision of erection and installation works (completion)		
	(i) energy, water and other infrastructure elements	20	Aug. 83
	(ii) mechanical workshop	20	Aug. 83
	(iii) foundry	24	Dec. 83
	(iv) running and performance tests (completion)	25	Jan. 84

(b) Schedule of fielding of project personnel-	Deadline	Duration in month
1. Project coordinator	April 1982	1
	April 1983	9
	January 1984	1
	October 1983	11
2. Foundry expert	April 1982	2
3. Industrial designers (review and verification of SIDO documentation)	April 1983	2
4. Experts in industrial installations	May 1983	4-1
5. Expert in mechanical workshop erection	July 1983	2
6. Expert in foundry erection	August 1983	3

Note: The ultimate dates of personnel fielding are subject of coordination by the team leader in accordance with the progress of works undertaken by the counterpart staff supervised by SIDO.

PROFESSIONAL SERVICES REQUIRED

		m/m	
A.	**Home office**		
1.	Substantial services	26	
2.	Administrative and clerical services	69	
B.	**In the project area**		
1.	Substantial service	38	m/m
2.	Number of travels to the project area	12	(Yugoslavia - Tanzania)
C.	**Preliminary and intermediate briefing: and debriefing**		
1.	Briefing and debriefing sessions DSA	3x3 days	
2.	Travel Belgrade-Vienna and return	3	
D.	Training of Tanzanian personel in Yugoslavia		

Explanations

A. 1. Man-month cost includes:

- salaries (subsistence cost)
- back-stopping support to the staff members in the area
- medical care and accident insurance
- overheads
- other contractor's costs

2. Transportation and travel costs should include:

Round air trips:

- Belgrade - Dar es Salaam - Mwanza - Dar es Salaam - Belgrade economic class. Air ticket calculated at the present price of US$ 1,525 . Total number of travels 12.
- Daily allowances during travel
- Length of time route to destination (2-2 days)
- Daily allowances during briefing in Vienna and lodging should be calculated as per the present rate of DSA applied by UN i.e. ADS 1,043.

B.1. Man-months in home office should include all activities shown in a seperate bar-chart diagram.

B.2. Local salaries etc. should be calculated net of all taxes, contributions and insurances.

Special remarks

Costs of the accomodation in Mwanza as well as local transport expenses in the project area are subject of a separate agreement between the sub-contractor and SIDO and will not be covered by UNIDO.

ANNEX 2

PROFESSIONAL SERVICES

PROFESSIONAL SERVICES IMPLEMENTED

A. HOME OFFICE

1. Substantial services .....Total of 49 man/months

List of works and services:

- General description of the foundry and mechanical workshop and their functions,
- Detailed plant layouts for the two shops including all necessary drawings, plant layouts in scale 1:50 along with all individual items of equipment and energy-utility requirements,
- Ordering and procurement of equipment,
- Complete data for civil engineering design, i.e. electricity network, water, communications, compressed air, drainage system, etc,
- Complete instructions for the operation of the equipment along with detailed specifications for raw materials required,
- Instructions and explanations for the execution of the project,
- Detailed work plan and time schedule,
- Process flow diagrams,
- Personnel requirements,
- Preparing of all necessary drawings according to the foundry technology required
- Preparing of technological charts
- Developing and implementing a training programme for the Tanzanian staff,
- Modification and adaptation of the overall design documentation to the size of the new building (godown) as well as to the new requirements of industrial infrastructure at project site, i.e.:

- technological and engineering design,
- assembly documentation,
- energy and utilities design along with specification of installation materials modified twice at SIDO`s request,
- new drawings for laboratory and mechanical workshop due to consecutive change in location of the equipment recommended by SIDO,
- Modification of design for compressor station and raw material boxes in order to reduce the costs in civil works as well as to minimize the use of construction materials, al made at SIDO`s request,
- Selection and specification of installation tools and implements, later modified at SIDO`s request,
- Complete documentation along with drawings and sketches for foundry tools, patterns, pattern plates, moulding boxes and previously chosen products,
- Complementary technological documentation for diversified production programme recommended and erquested by NEFCO (Nyanza Engineering and Foundry Co. LTD) associated with Nyanza Farmers Cooperative Unit (Ginnery parts)

2. Administrative and clerical services

66 man/months (out of the total of 69 man/months) of Home - office support services already provided.

B. IN THE PROJECT AREA — Total of 52 man/months

1. Substantial services

Review of the engineering design of TAN consult:

- review of finished construction design
- checking the conformity of the buildings to the production equipment,
- review of utility and energy supply design,
- checking the availability of production and installation materials,
- inspection of the foundry location, local conditions and possibilities,
- checking of the power sources,
- checking of the production materials sources,
- checking of the industrial infrastructure
- selecting of the proposed production programme

Selected production programme includes total number of 2o various grey iron castings (as per Enclosure No. 1o.)

- checking the proposed building Godown)
- checking the foundations of machinery and equipment,
- advising the electrical installation designing,
- selecting the adequate electrical material,
- advising the water lines designing, sewage systems designing, the pump station - water reservoirs designing, etc.
- checking the enternal and in-site roads and transportation means
- advising the compressed air system designing,
- checking the spaces for storage of raw materials,
- checking the present state of works on the site,
- provision of temporary electric power supply for the installation works only,
- checking the availability of qualified and unqualified installation manpower.

- checking the availability of a mobile crane for installation works necessities,
- identification of delivered equipment and materials and checking the storage condition during of it`s 2,5 years staying on site,
- checking the acceptability of proposed accommodation for the use of Yugoslav experts,
- checking the present state of works on the site,
- checking the availability of proposed new accommodation for the use of Yugoslav experts,
- discussion in The Ministry of Industry of UR Tanzania and in UNDP Dar-es-Salaam, in the presence of SIDO`s, representatives and representative of Yugoslav Embassy for the purpose of solving the most important problems which could be summarized in brief as follows:
- scarcity of the funds required to complete all the civil engineering and installation works,
- shortage of electrical power at Mwanza,
- provision of complementary equipment required to operate the foundry,
- provision of UNDP-INPUT required to subcontract all the commissioning works etc.

2. List of installation works:

- Detailed checking the supplied equipment, sorting and preparing for the installation purpose,
- Survey of "as made" foundations including additional work,
- Placing, locating, fixing and concreting anchors in the bearing structure: item 1.02.1.00,

- Erection of shell of Section 1, item 1.o2.2.o2,
- Erection of platform columns of cupola furnace item 1.o2.8.o1, including concreting of anchoring bolts,
- Erection of platform at + 2,oo m and stairs 1, items 1.o2. o8.o4. and 1.o2.8.o7.1.,
- Erection of platform at +4,85 m and stairs no 2, item 1.o2.8.o7.1. and 1.o2.8.o7.2.
- Erection of section 2 of cupola furnace, items 1.o2.4.oo, 1.o2.2.1o. and 1.o2.2.13,
- Construction of scaffoldings for erection of section 3.
- Erection of section No. 3, item 1.o2.5.oo,
- Construction of scaffoldings for erection of section 4,5 and spark arrestor
- Erection of section 4, item 1.o2.5.o1,
- Erection of section 5, item 1.o2.5.o2,
- Erection of spark arrestor, item 1.o2.6.oo,
- Installation of air pipeline, item 1.o2.7.oo,
- Erection of blowers (fan),
- Erection of charging basket, item 1.o2.9.oo-1,
- Fitting of inspection door and cover, item 1.o2.2.o9 and 1.o2.2.11,
- Fitting of bottom door, items 1.o2.2.18 and 1.o2.2.19,
- Erection of item 1.o2.2.14,
- Erection of support,
- Erection of skip supporting structure,
- Installation of skip drives, elements,
- Erection of basket and rope,
- Survey of lubrication and inspection of correct condition of individual equipment,
- Locating, fixing and concreting of anchoring bolts in the bearing structure, item 1.o3.1.oo,

- Erection of drum, including fixing bearings, item 1.o3.3.oo,
- Erection of the cover, item 1.o3.5,
- Measuring and tracing of foundry monorail,
- Erection of columns and beam, items 1.o4.1, 1.o4.2, and 1.o4. with concreting,
- Erection of monorail switch, item 1.o4.14,
- Erection of monorail (curves) lines, items 1.o4.12, 1.o4.9. and 1.o4.7.
- Erection of straight monorail lines, items 1.o4.6, 1.o4.8, 1.o4.1o and 1.o4.11,
- Erection of lifting devices, item 1.o5. (ref. foundry monorail),
- Erection and fixing of scales, item 1.1o,
- Testing of scales,
- Survey of "as made" state of crane supports,
- Erection of crane rails,
- Assembly of front supports and beam,
- Measuring, tracing of terrain including layout of equipment,
- Erection and concreting of shake-out grid bearing structure, item 2.1o.1,
- Erection, of shake-out grid (mechanical and electric works),
- Erection, levelling and concreting of columns for roller conveyer,
- Mechanical mounting of the wheelabrator (shot blast machine) KZ-16oo, item 4.o.1. including concreting of anchoring bolts,
- Placing of benches and concreting of anchoring bolts item 4.o7,
- Unpacking, survey and sorting of equipment,
- Measuring and tracing of the terrain for equipment installation,

- Placing of the top part of the sand mixer,
- Placing of the bottom part of the sand mixer,
- Placing of columns for hopper including concreting of anchoring bolts,
- Erection of platform on the level of 2,2o m,
- Stairs erection,
- Erection of the lift first section
- Placing of supporting profiles for hoppers,
- Erection of the hopper cone-plates,
- Erection of the hopper vertical side - plates,
- Erection of the lift, second section,
- Erection of the hopper platform on the level of +8,oo m,
- Mounting of the polygonal sieve,
- Erection of the stairs supprt
- Erection of the core sand - hopper,
- Erection of the core making benches,
- Installation of the 35 l. core sand feeder,

Locating of sand mixer including concreting of anchoring bolts,

- Erection of the conveyer bearing structure, item 2.1o,
- Erection of the conveyer, item 2.1o,
- Erection of the conveyer bearing structure, items 2.11, 2.11.1. and 2.o6,
- Erection of the conveyer, item 2.11,
- Erection of the conveyer, item 2.o6.1,
- Erection of the conveyer, item 2.11,1,
- Erection of the magnetic separator bearing structure,
- Erection of the magnetic separator,
- Erection of "VEDA" hoist,
- Erection of conveyer bearing structure, item 2.o8,
- Erection of conveyer, item 2.o8,
- Erection of a hoppers above the moulding machines,

- Concreting of the anchoring bolts of conveyer bearing structure,
- Installation works on the pneumatic line, item 2.05,
- Installation of the sand mixer exhaust pipeline,
- Erection of the sand mixer fan and pipeline,
- Erection of the dyclone dust arrestor bearing structure (two production lines) including concreting of anchoring bolts,
- Erection of the cyclone dust arrestor,
- Erection of the fan and pipeline pushing part,
- Erection of the pipeline suction part,
- Compressor station: acceptance, unpacking of equipment, including inspection and sorting out of equipment, layout in the storage,
- Inspection of "as made" condition of civil engineering works and foundations - and correction works,
- Inspection of machining hall, elimination of a smaller shortages and detailed cleaning of the hall,
- Marking of places for installation of individual machines and mounting of tool cabinets,
- Unpacking and inspection of delivered lathes, assembling
- Washing of lathes, inspection of lubrication, checking the electro - motor rotation and lathe operations,
- Unpacking and inspection of milling machine, asembling,
- Unpacking and inspection of drilling machine, assembling,
- Unpacking of two-sided tool milling machine: preparing of it`s basis from "L" profiles, washing, inspection of lubrication, operations etc.

- Unpacking and assembling of locksmith`s benches and tools,
- Electric - installation works connected with fan,
- Electric installation works connected with skip crane,
- Erection and connecting to el. installation and pipeline of fuel oil burner, item 1.o3.6.o,
- Locating of Al - furnace housing including anchoring bolts, concreting
- Erection of hydraulic generating set and installations for oil distribution,
- Erection of fan and air pipe distribution for burner,
- Erection of burner including connecting of el. power and fuel oil,
- Erection of furnace cover including fitting of graphite crucible,
- Lifting of bridge to the crane rail,
- Electrician `works,
- Electrician`s works for item 4.ol (shot blast machine)
- Machine connected to the pneumatic installation,
- Installation of the swing-type grinder and connection to the electric installation (item 4.o2)
- Installation of stationary grinding machine including connection to el. wiring and concreting of anchoring bolts (item 4.o6)
- Connection of hand operated pneumatic grinders to compressed air distribution network (item 4.o5)
- Erection and fixing of core sand mixer,
- Erection and fixing of dozing belt conveyer,
- Insertion of rubber belts (five conveyers) including vulcanization,
- Electrician`s works (items 2.o5, 2.o3, 2.o5, 2.o6, 2.o8, 2.lo, 2.11, 2.11.1. 2.11.5, 2.13, 2.ol.1.)
- Installation works on the water pipeline (item 2.o5.)
- Installation of the mixing charging basket,

Lubrication of bearings, reduction gear and transmission elements,

- Electrician`works
- Compressor erection on the foundation and its levelling,
- Air cooler erection and its connection to the compressor,
- Erection of the air distributor, erection of steam traps and water separators 04G-20,
- Erection of air tank and its anchoring,
- Erection of compressed air installations, connecting of compressor with cooler, water separator and tank,
- Erection of impulse lines and measuring fittings,
- Washing of milling machine, inspection of lubrication. Inspection of el. motor direction of revolutions, test of machine operations,
- Washing of drilling machine
- Inspection of lubrications. Inspection of el. motor direction of revolutions. Test of machine operations.
- Unpacking and assembly of carpenter`s benches and other carpenter`s tools,
- Inspection of complete delivered equipment

Cleaning of the hall.
Marking of transport routes,

- Cold tests.

C. The training of 14 participants from Tanzania in the production plants in LŽT "Kikinda" in Kikinda was successfull. After one-month theretical training, all participants were assigned to appropriate work places, and took part in the process of normal-commercial production. Most of the trainees possessed comprehensive knowledge in occupational skills, even before the training started.

Apart from the contracted six months training programme, the following services have been additionally carried out:

- technical literature, technological instructions, drawings, etc. (about 4ooo pages),
- four different sets of patterns and core boxes for chosen products, very suitable for start-up production,
- organization of study-tour to the selected foundry plants and presentation of technological problems related to the projected production at SIDO foundry at Mwanza,
- organization of one-month course in Serbocroation language.

The training was carried out in the period between 2nd june and 26th November 1984, in accordance with the enclosed training programme (Enclosure No. 11).

D. Briefings have been taken twice a year. Some of these briefings were tripartite types.

ANNEX 3.

EQUIPMENT

List of equipment, materials and tools procured

within the subcontract

UNIT: MELTING SHOP

YUGOSLAV SUPPLY

ITEM	D E S I G N A T I O N	Q T Y	TECHNICAL DATA
1.	Cupola furnace	2 pcs	6oo mm DIA
2.	Receiver	1 pc	LD 5 - 1,o t.
3.	Pouring monorail	1 set	63 m length
4.	Pouring ladle	3 pcs	7o kg.
5.	Pouring ladle	5 pcs	2oo kg.
6.	Tools and accessories	set	-
7.	FAN	1 pc	4ooo Nm^3/hour
8.	Platform	set	
9.	Fire-clay brick	975 pcs	KU - 1
1o.	Fire-clay brick	2o55 pcs	Normal
11.	Fire-clay mixture	5ooo kgs	M.P. - 6
12.	Fire-clay mixture	3ooo kgs	V-K.A.
13.	Cast iron brick	8o pcs	Vertical lining
14.	Cast iron brick	15 pcs	Edge lining
15.	Set of pattern tools for iron brick production		
16.	Industrial scale, measuring	1 pc	Range 1ooo kgs
17.	Skip	1 pc	1 T, 7 m
18.	Aluminium melting furnace	1 pc	15o kg
19.	Pouring ladle lift device	3 pcs	3oo kgs, 16oo mm
2o.	Oil burner	2 pcs	-
2.	Bricklayer`s trowel	1 pc	-
22.	Bricklayer`s scoop	1 pc	-
23.	Bricklayer`s hammer	1 pc	7oo gr
24.	Plumb - bob	1 pc	3oo gr
25.	Wheelbarrow	3 pcs	-
26.	Asbestos glove	2 pairs	-
27.	Compasses	1 pc	DIA 5oo mm
28.	Compasses for holes	1 pc	DIA 25o mm
29.	Pneumatic gun	1 pc	-

UNIT: MOULDING SHOP

YUGOSLAV SUPPLY

ITEM	DESIGNATION	Q T Y	TECHNICAL DATA
1.	Moulding flask	2 pairs	562x44ox2oo (mm)
2.	Roller conveyers		84 m
3.	Shake - out grid	1 pc	IR - o5
4.	Overhead travelling crane	1 pc	2 t x 9 m, type JMD
5.	Tools and accessories		-
6.	Pneumatic rammers for sand	2 pcs	Type NP - 18
7.	Flask pallette	2 pcs	looox62o (mm)

UNIT: SAND PREPARATION AND CORE SHOP

YUGOSLAV SUPPLY

ITEM	DESIGNATION	Q T Y	TECHNICAL DATA
1.	Moulding sand mixer with dozing equipment	1 set	M 25, 5oo lit
2.	Core sand mixer with dozing equipment	1 set	MJ-5o, 5o lit
3.	Molding sand transportation equipment: two belt conveyers	2 sets	37 m each
4.	Return sand belt conveyer	3 sets	49 m each
5.	Polygonal sieve	1 pc	15 t/h, 12x12 (mm)
6.	Cyclone	1 pc	16000 m^3/h
7.	Magnetic separator	1 pc	5oo mm
8.	Hopper assembly with platform carrying construction for storing of sand, additives and moulding sand	1 set	-
9.	Additive and new-sand hoist with separator	1 set	1 Mp
1o.	Tools and accessories	set	-
11.	Working bench	2 pcs	14oox8oox8oo (mm)

UNIT: CLEANING SHOP

YUGOSLAV SUPPLY

ITEM	DESIGNATION	Q T Y	TECHNICAL DATA
1.	Wheelabrator unit with cyclone	1 set	K2-16oo
2.	Pedestal two-side grinder	2 pcs	4 kW, 45o mm DIA
3.	Swing type grinder	1 pc	4 kW, 4oo mm DIA
4.	Working bench	5 pcs	looox8oox8oo (mm)
5.	Balance, measuring	1 pc	range up to looo kgs
6.	Tools and accessories	1 set	-
7.	Pneumatic grinding machine	5 pcs	Type VR 485/BV 4-12
8.	Pneumatic grinding machine	5 pcs	Type V 318o/BV 3-6E
9.	Self - closing valve	5 pcs	Type VC 1o-o,8
1o.	Connection	5 pcs	Type PR 1/4 V-o,8
11.	Pneumatic gun	9 pcs	-
12.	Grinder stand	1 pc	-
13.	Stable grinder	1 pc	Type BT - 25o
14.	Self-closing valve	5 pcs	Type VC 13-1,7
15.	Connection	5 pcs	Type PR 1/2V-1,7

UNIT: ALUMINIUM FOUNDRY

YUGOSLAV SUPPLY

ITEM	DESIGNATION	Q T Y	TECHNICAL DATA
1.	Aluminium melting furnace	1 pc	
2.	Rolling conveyer	set	44 m
3.	Tools and accessories	set	

UNIT: LABORATORY

YUGOSLAV SUPPLY

ITEM	DESIGNATION	Q T Y	TECHNICAL DATA
1.	Gas and volumetric determinating of C and S content	1 set	Type KU - 47
2.	Automatic analytical balance	1 set	Range up to 1oo gr.
3.	Vessels for weighing AL	1o pcs	7o mm
4.	Brushes for scale cleaning	5 pcs	-
5.	Plugs	1 kg	No.6
6.	Stand for filtration with 3 funnels	4 pcs	-
7.	Spraying PVC bottles	4 pcs	5oo ml
8.	PVC spoon double	1o pcs	18o mm
9.	Pincers for small pot	5 pcs	45o mm
1o.	Brushes for glass washing	1o pcs	-
11.	Laboratory thermometer	3 pcs	H8,o-100° C
12.	Bottle for gas washing	5 pcs	25o Ml, Vega
13.	U-pipe with ground seal	8 pcs	16x16o tlcs
14.	Laboratory glass	5o pcs	25o ml pula
15.	Laboratory glass	5o pcs	6oo ml pula
16.	Laboratory glass	1o pcs	1ooo ml pula
17.	Round bottle	2o pcs	3oo ml pula
18.	Clock glass	2o pcs	DIA 1oo mm pula
19.	Funnel for quick filtration rubber	1o pcs	dia 8o mm pula
2o.	Pipette	1o pcs	1o ml 1/1o tlos
21.	Pipette	1o pcs	5 ml 1/2o tlos
22.	Spraying bottle with rubber seal	4 pcs	1ooo ml pula
23.	Distilled water bottle with tube and tap at bottom	2 pcs	1o.ooo ml pula
24.	Dripping bottle	5 pcs	5o ml KP 3174
25.	Funnel	5 pcs	DIA 1oo mm pula
26.	Round bottle for weighing	3 pcs	5oo ml pula
27.	Porcelain vessels for annealling	4ooo pcs	9ox15x9 (mm)
28.	Small pot Pt with lid	1 pc	No.7

ITEM	DESIGNATION	Q T Y	TECHNICAL DATA
29.	Marsh's furnace for quick estimation of C content with combustion pipe and transformer-set of apparatus for estimation of C and S contents in steel	1 set	
3o.	Ceramic tube	5o pcs	17x22x6oo (mm)
31.	Laboratory glass	5 pcs	3ooo ml
32.	Exiccator with tube and tap on lid vacuum	3 pcs	DIA 2oo mm
33.	Cylinder	5 pcs	5o ml
34.	Graduated vessel	5 pcs	5oo-2ooo ml
35.	Graduated vessel	2 pcs	25 ml
36.	Burette automatic dark	2 sets	5o ml
37.	Burette automatic	2 sets	25 ml
38.	Porcelain annealling pot	5o pcs	4ox32 mm
39.	Round measuring bottle	3 pcs	1ooo ml
4o.	Tube for Ca Cl 2 with ball	5 pcs	

UNIT: MACHINING SHOP

YUGOSLAV SUPPLY

ITEM	DESIGNATION	Q T Y	TECHNICAL DATA
1.	Universal lathe	2 pcs	Type US-4ooA/1ooo
2.	Standard accessory	2 sets	2 x 3 items
3.	Special accessory	2 sets	2 x 16 items
4.	Universal milling machine	1 pc	Type FA 3 AU
5.	Standard accessory	1 set	3o items
6.	Special accessory	1 set	3o items
7.	Radial drilling machine	1 pc	Type RB-4o SPA
8.	Standard accessory	1 set	3 items
9.	Necessary accessory	1 set	11 items
1o.	Rectifier for electric welding	1 set	Type LCH-575 A
11.	Welding equipment, with 2x1o m cable and clamps	1 set	-
12.	Smith's working bench with hard wood top	6 sets	Type DM-1
13.	Joiner's bench	2 pcs	-
14.	Joiner's tools	1 set	-
15.	Pair of compasses	1 pc	-
16.	Vertical ruler	1 pc	1ooo mm
17.	Feeler gauges	1 set	o,o5 - 1,oo
18.	Screw pitch gauge	1 set	-
19.	Hand mask	1 pc	-
2o.	Hacksaw blades	12 pcs	HSS 2/2 3oo
21.	Metal drills	1o pcs	DIA 8 mm
22.	Masonry drills for stone	1o pcs	DIA 8 mm
23.	Steel vice	8 pcs	12o mm
24.	Glass for mask	5 pcs	1o x 1o mm
25.	Welding set	1 set	GZV-4
26.	Vertical ruler	1 pc	75o mm
27.	Caliper	2 pcs	3oo mm
28.	Depthmeter	3 pcs	3oo mm

ITEM	DESIGNATION	QTY	TECHNICAL DATA
29.	Flexible ruler	1 pc	1ooo mm
3o.	Protractor universal	1 pc	Type 2oo/3oo
31.	Spirit level - wooden	1 pc	5oo mm
32.	Planes	1 pc	14ox25o mm
33.	Oxygen reducing valve	1 pc	-
34.	Acetylene reducing valve	1 pc	-
35.	Brush	4 pcs	6o/MT
36.	Bumping hammer	1 pc	5oo gr
37.	Hollow screw wrench	4 pcs	14 mm
38.	Hollow screw wrench	4 pcs	19 mm
39.	Vernier caliper	5 pcs	15o mm
4o.	Vernier caliper	4 pcs	3co mm
41.	Vernier caliper	2 pcs	4oo mm
42.	Vernier caliper	1 pc	1ooo mm
43.	Dial gauge	4 pcs	DIA 6o-1/1oo
44.	Dial test indicator	1 pc	DIA 38-1/1oo
45.	Ruler	1 pc	5oo mm
46.	Ruler	1 pc	1ooo mm
47.	Tools in a tool box	4 sets	art. 525
48.	Electrician`s tools	2 sets	-
49.	"Minirek" shelves with 5 sections:		
	- column	8 pcs	2 m
	- foundation plate	8 pcs	-
	- connecting support	3o pcs	VNM 19o
	- assembly beam	16 pcs	PM-1oo
5o.	Comb. insulated pliers	1 pc	2oo mm
51.	Monkey wrench	1 pc	25o mm
52.	Screw drivers	1 set	5 pcs
53.	Saw frame	2 pcs	-
54.	Smith`s hammer	1 pc	4oo gr.
55.	Open-end spanner	1 set	6-22 (mm)
56.	Electric saw	1 pc	DIA 25o mm
57.	Hand operated el. driller	1 set	max DIA 13 mm

ITEM	DESIGNATION	Q T Y	TECHNICAL DATA
58.	Smith`s metal desk with 3 drawers	1 set	
59.	Smith`s working desk with 6 drawers	1 set	-
6o.	Single metal tools cabinet	4 sets	-
61.	Smoothing plate	1 pc	16oox1ooo mm
62.	Tools in tool box	3 sets	art. 53o
63.	V - blocks	2 pcs	2oox17ox8o mm
64.	Smith`s steel square	1 pc	4oox265 mm

UNIT: TRANSPORT FACILITIES

ITEM	DESIGNATION	YUGOSLAV SUPPLY Q T Y	TECHNICAL DATA
1.	Transport storage case	2o pcs	looox8oox8oo mm
2.	Tiltung cart	6 pcs	
3.	Hand operated cart	2 pcs	Type "Turtle", 5oo kgs
4.	Hand operated cart for flasks	1 pc	RB o2 B
5.	Fork lift	2 pcs	Type "Turbomatic" TU-2o
6.	Pallettes	3 pcs	1,5 t
7.	Core rack	4 pcs	total 3o m²
8.	Transporting containers metallic	2o pcs	12oox8oox7oo mm

UNIT: DUST COLLECTING

YUGOSLAV SUPPLY

UNIT	DESIGNATION	Q T Y	TECHNICAL DATA
1.	Exhaust hood	4 pcs	7oo x 7oo mm
2.	Table with lettice as a working surface for cleaning	4 pcs	-
3.	Cyclone cone	2 pcs	ASH 1oo/8o
4.	Cyclone cap	1 pc	ASH 1oo/82
5.	Construction column with plates	8 pcs	2N PU 1ox61oo mm
6.	Diagonal NPL	72 pcs (8m)	5o x 5o x 5 (mm)
7.	Diagonal NPL	16 pcs (1,2m)	7ox7ox7 (mm)
8.	Profile NPL	7o pcs (o,7m)	45x45x4 (mm)
9.	Cyclone separator housing	2 pcs	ASH 1oo/8o
1o.	Frame 2NPU	8 pcs	1o x 182o (mm)
11.	Cyclone separator Cap	1 pc	ASH 1oo/8o
12.	Diflector	1 pc	DIA 2oo, 30^{o}
13.	Plastomastic	15 pcs	DIA 6 mm
14.	Nut screw	85o pcs	M 1o x 3o (mm)
15.	Nut screw	3oo pcs	M 6 x 25 (mm)
16.	Nut screw	12o pcs	M 8 x 4o (mm)
17.	Centrifugal fan with el.motor	2 pcs	Type SMK
18.	Antivibrational washers	8 pcs	-
19.	Anchor screw	32 pcs	M 16 mm
2o.	Nut screw	32 pcs	M 16 mm
21.	Tube	6,4o m	DIA 12o mm
22.	Tube	1,5o m	DIA 16o mm
23.	Tube	26,6o m	DIA 2oo mm
24.	Tube	2o,oo m	DIA 25o mm
25.	Tube	2,1o m	DIA 28o mm
26.	Tube	11,3o m	DIA 3oo mm
27.	Tube	1,6o m	DIA 32o mm
28.	Tube	17,9o m	DIA 35o mm
29.	Tube	3,3o m	DIA 38o mm

ITEM	DESIGNATION	Q T Y	TECHNICAL DATA
3o.	Tube	5,85 m	DIA 4oo mm
31.	Tube	22,95 m	DIA 5oo mm
32.	Conus tube	o,8o m	35o/5oo mm
33.	Bifurcation tube element	11 pcs	various
34.	Elbow	52 pcs	various
35.	Flange	6 pcs	various

UNIT: COMPRESSED - AIR STATION

ITEM	DESIGNATION	Q T Y	TECHNICAL DATA
1.	Compressor generating set	1 set	Type E 1MK-2o6o
2.	Tank R lo/lo	1 pc	lo m^3
3.	Control assembly and feeding assembly	1 pc	Type US-55
4.	Outlet cooler	1 pc	Type HEZ-6
5.	OK-water separator	2 pcs	Type OUG-6
6.	Collector	1 pc	Type K-1
7.	Flexible pipe	1,2 m	No. 65
8.	Pipe line fittings	set	various

ENCLOSURE No. 1.

IMPLEMENTATION BAR - CHART

No.	A C T I V I T Y	D E A D L I N E		
		Contracted 16/06/82.	Revised 28/02/83.	Implemented
1.	Awarding the Contract			Jan. 81.
2.	Concluding the contract between SIDO and Invest-Import	Apr. 81.	-	Nov. 81.
3.	Planning and scheduling of process documentation	Jan. 82.	-	Feb. 82.
4.	Specification of raw material and labour standards	Jan. 82.	-	Feb. 82.
5.	Tender documentation for equipment procurement	Jan. 82.	-	Jan. 82.
6.	Documentation of work methods	Jan. 82.	-	Jan. 82.
7.	Detailed technological and engineering design	Feb. 82.	-	Feb. 82.
8.	Procurement and contracting of equipment and machinery	Feb. 82.	-	Jan./Mar.82.
9.	Building erection	Sept.82.	Apr.83.	Apr. 85.
10.	Technical documentation for assembly and installation of the equipment	Sept.82.	-	July 82.
11.	Completion of training of Tanzanian personnel in Yugoslavia	Sept.82.	June 83.	Nov. 84.
12.	Shipment of equipment			
	- first lot	Aug. 82.	-	-
	- final lot	Dec. 82.	-	Dec. 82.
13.	Supervision of erection and installation works (completion)			
	- energy, water and other infrastructure elements	Aug. 83.	Feb. 84.	July 86.
	- mechanical workshop	Aug. 83.	Feb. 84.	July 86.
	- foundry	Dec. 83.	Feb. 84.	July 86.
14.	Running and performance tests (completion)	Jan. 84.	Apr. 84.	-

ENCLOSURE No. 2

REPORT ON

THE TRIPARTITE REVIEW MEETING

31 March 19?

UNITED NATIONS
DEVELOPMENT PROGRAMME

With the Compliments

of

P. O. Box 9182
DAR ES SALAAM

Telephone 27411

UNITED NATIONS DEVELOPMENT PROGRAMME

DAR ES SALAAM

UNITED REPUBLIC OF TANZANIA

REPORT ON

THE TRIPARTITE REVIEW MEETING HELD

ON MONDAY 28 FEBRUARY 1983

Project No. and Title: URT/80/C28 - Establishment of a SIDO Foundry With Integrated Mechanical Workshops

Review Period: October 1981 - February 1983

Executing Agency: UNIDO

Country:	United Republic of Tanzania
Project Number:	URT/80/022
Project Title:	Establishment of a SIDO Foundry with Integrated Mechanical Workshops
Executing Agency:	UNIDO
Government Counterpart Agency:	Ministry of Industries, Small Industries Development Organization (SIDO)
Scheduled date for Completion of Field Work:	March 1984

INTRODUCTION

The first tripartite review meeting on the above project was held at the Headquarters of SIDO, on Monday 28 February 1983 at 10:30 a.m. with the following persons in attendance:

Government

Mr. W.L. Nyachia	-	Chairman Acting Director of Investments and Project Implementation Ministry of Industries
Mr. E.P.A. Simvela	-	Senior Economist, Ministry of Industries
Mr. E.B. Toroka	-	Director General, SIDO
Mr. R.H. Sabuni	-	Co-ordinator, Industrial Estates Division, SIDO
Mr. F.H. Kinunda		Ministry of Planning and Economic Affairs
Mr. H.H. Nyamugali	-	Small Scale Industries, Ministry of Industries
Mr. M. Laiser	-	Acting Director of Research and Planning, SIDO
Mr. F. Ifunia	-	Engineer, Industrial Estates (SIDO)

Yugoslavia

Mr. R. Petra	-	Deputy Director, Invest-Import

UNDP

Mr. P.S. Reynolds - Deputy Resident Representative

UNIDO

Mr. M. Czut - Senior Industrial Development Officer

Mr. S.K. Henein - Senior Industrial Development Field Adviser.

The Chairman, Mr. Nyachia, and the Director General of SIDO, Mr. Toroka welcomed the participants to the meeting, and advised that Mr. Masanja of the Ministry of Finance was expected to attend the meeting. He also advised that he was authorized to state that the Government places a very high priority on the project and will make available the funds necessary for the project to take off without further delay.

SIDO presented to the meeting copies of quarterly report No. 1 (November 1982 to January 1983), Annex II and progress report (January February 1983), Annex I. Mr. Sotra also submitted the quarterly report for October/December 1984, Annex III attached.

The agenda (Annex IV) was adopted except for a brief review of the progress on the implementation of the work plan as follows:

I. Progress in the Implementation of the Work Plan

1. Concluding the contract between SIDO and Invest-Import: Done.

2. Preparation of the technical data for civil engineering design: This has been done.

3. Award of Subcontract: UNIDO has awarded the subcontract to Invest-Import of Yugoslavia.

4. Building and civil engineering design: The design has been completed and is being reviewed to conform to the concept of using steel columns instead of reinforced concrete, and is expected to be completed by NECO in two weeks' time.

5. Preparation of technological engineering design: The process technology to be used is established, but all engineering work related to products is pending information from SIDO on the production programme.

6. Building erection scheduled to be completed in March 1983 has not started yet.

7. Training in Yugoslavia, scheduled for completion in March 1983 has not been undertaken.

8. The equipment has been shipped and is expected to arrive at Dar es Salaam harbour, in two weeks' time.

9. Installation of the equipment due to be completed in May 1983, has not started.

10. Performance testing to be completed in June 1983 has not been undertaken.

11. Attainment of projected capacity by September 1984, has not been undertaken.

A suggested revised work plan is attached (Annex V).

II. Timely Delivery of Inputs

(a) Government Inputs

(i) Assignment of National Staff

A project manager, Mr. M. Mwalimbaega has been appointed and is now resident in Mwanza. At present, he is technical officer at SIDO's Regional Office, but will devote his time fully to the project when activities start. Mr. Ifunya is co-ordinating at the Headquarters level, assisted by SIDO HQ staff. SIDO has now shortlisted a number of potential candidates for plant personnel and will finalize selection in two months' time. The technical staff will be graduates of Technical Colleges and would have a minimum of three years' experience in industry.

(ii) Project Site

The selected site in Mwanza is maintained. An alternative site previously suggested has not been approved by the authorities.

(iii) Technical Data of the Project Site

All the details concerning the selected site have been given to the Yugoslav side.

(iv) Production Programme

As indicated in the attached SIDO report, the product mix has to adhere to the requirements of several parties including parts for the Ginnery, textile machinery, irrigation pumps, motor car spare parts etc. SIDO will provide details by end of May. It has been suggested that only priority marketable items representing about 50% of capacity should be given, leaving room for flexibility in making adjustments to the production programme as needed.

(v) Civil Engineering Design

The modified design will be agreed upon with Mr. Sotra, or if necessary, in urgent consultation with Mr. Lepedat, Director of Invest-Import to avoid any further delay.

(vi) Industrial Infrastructure

Mr. Nyachia stated that the contractor's work will include some of the industrial infrastructural requirements. Anything which may not be included in the terms of reference of the General Contractor will be implemented simultaneously. Electric power including high voltage transformers, cables and switchgear will be provided by TANESCO. It has been noted that there has been some recent improvements in the power supply situation in Mwanza. However, in order to avoid the consequences of power cuts, a standby diesel generator is recommended for the operation of the cupola in case of emergency.

(vii), (viii) Buildings and Social Facilities

The tendering procedure can be simplified to expedite action on the construction work. Building erection is now scheduled to start in April 1983.

(ix) Housing

Arrangements will be made in agreement with the Government and the National Housing Corporation (NHC) for the provision of suitable housing accommodation from available units.

(x) Complementary Equipment

The list of complementary equipment for the foundry related to laboratory pattern-making and moulding etc. is given in Annex VI and is estimated to cost about US$ 400,000.

The list of essential imported raw materials is also given in appendix iii (b) to SIDO's attached progress report. Mr. Czub suggested that an initial quantity of about 10% of the estimated annual requirements should be ordered for the starting up of the foundry in 1984.

(xi) Transportation

As agreed between SIDO and Invest-Import, the equipment has been packed to enable its inland transportation and storage within the existing capabilities. SIDO indicated that it has adequate and secure storage facilities available in Mwanza.

(b) UNDP/UNIDO and Yugoslav Inputs

(i) Assignment of International Staff

Project personnel and their CV's were given in the list of attached documents prepared in Vienna in March 1982 and attached to the terms of reference for Invest-Import.

(ii) Engineering design has been completed.

(iii) UNDP financed supplementary equipment has been shipped together with the equipment covered by the Yugoslav Government contribution.

(iv) Group Training and Study Tours could not be implemented due to unavailability of candidates.

III. Progress in Delivery of Outputs

The establishment of the foundry (output A) has not progressed since the civil construction work could not be undertaken. Likewise, outputs 'B' to 'E''(production of castings, trained personnel, technical assistance and metal testing services), could not be delivered. Output 'F', namely Policy and Procedural Manual will be compiled and developed by Invest-Import from technical data and specifications provided by equipment manufacturers, and developed by project personnel during the course of implementing the project.

IV. Prospects of Achieving the Project's Immediate Objectives

Since there has been a delay of one year, it is expected that the implementation schedule would be rephased accordingly.

V. Adequacy of Project Design

It has been agreed that a project revision should be finalized to spell out more clearly and in sufficient detail the work plan for the project, indicating within a time framework the activities to be undertaken and by whom. The revised work plan agreed upon by Invest-Import, UNIDO, and SIDO is attached herewith as Annex V.

It has been noted with concern the difficulty in securing the foreign exchange necessary for the complementary equipment given in Annex VI and imported raw materials as given in Appendix (iii) (b), which are essential to the project. Consideration was given to possible solutions through either a commercial credit between Invest-Import and SIDO, barter trade agreement between the Governments of Tanzania and Yugoslavia, or a Tanzanian shilling cost sharing contribution by the Government of Tanzania to UNIDO which would provide the equivalent foreign exchange required for these inputs. If the proposal was approved by the Ministry of Finance and the funds were deposited in advance, it was agreed that Government would take the necessary steps to explore these possibilities.

VI. Any Other Business

In reply to a question on the amount of money allocated to the project from the government development budget, the Chairman confirmed that an adequate sum has been allocated up to June 1983 to cover the project activities planned for the current financial year. He also confirmed that the Government places very high priority on the project and would include in the budget for 1983/84 the required amounts for the continued implementation.

VII. Recommendations and Conclusions

The participants agreed that a project revision including both UNDP and Government budgets should be prepared to clarify in full detail the activities to be carried out by the various parties concerned in a time framework, and that positive action must be taken to avoid further delay. The following recommendations are made:

1. The Tanzanian Government will take appropriate action to ensure the flow of funds necessary for the uninterrupted implementation of the civil construction work now scheduled to start in April 1983, and the industrial infrastructure in accordance with the revised work plan. The budget estimate is given in Annex VII.

2. SIDO will take appropriate measures for the safe handling and storekeeping of the equipment from unloading at the harbour until installation starts.

3. SIDO, UNDP and UNIDO will prepare a draft revision document which will include a detailed updated work plan and government budget, as well as rephased UNDP budget to reflect the current status.

4. The Government will investigate the possibility of securing the foreign exchange required to finance the importation of the complementary equipment and raw materials, while UNIDO and the Government will explore the idea of cost sharing, and Invest-Import will look into the possibility of providing commercial credit.

5. To ensure proper preservation of the equipment during storage, SIDO will investigate the possibility of delaying customs inspection to be effected on site prior to installation.

6. SIDO will submit to Invest-Import by May 1983 details of the production programme for the foundry.

7. SIDO will recruit three engineers by July 1983, plan and organize their training programmes in existing foundries and abroad in consultation with UNIDO and Invest-Import.

8. A small diesel generator should be included in the list of complementary equipment to avoid the consequences of power failures on the operation of the cupola.

SMALL INDUSTRIES DEVELOPMENT ORGANIZATION

Project with Intermediate Mechanical Workshop, Mwanza, Tanzania - [illegible], Contract No. [illegible]
Quarterly Report Period January/February 1983

A. GENERAL

This report covers the stage of implementation of the project in Mwanza and is a continuation to Quarterly Report No. 1 (SIDO) for the November - January, 1983. It is also prepared for the tripartite review meeting.

B. ACTIVITIES

1. During the months of January and February, SIDO in collaboration with the Ministry of Industries embarked itself in the activity of negotiating and raising of the funds.

   The Ministry has instructed NDC, TDAI, SMC, SARUNI and TEXCO to purchase shares and thus participate as share holder in the Mwanza project. NDC and TEXCO have indicated their unwillingness to participate in the said venture due to shortage of funds. MFC has already committed itself to contribute to the project to the tune of up to 10m. It will release to SIDO T.Shs. 2.25 million by the end of March and contribute quarterly as per agreed project cashflow.

2. Development plan has already blessed the project and is processing to reallocated T.Shs. 4.4 million for civil construction, for the period of up to June 1983. The amount of money raised in 1 and 2 will be sufficient, as the cashflow up to June 1983 reflects an outflow of T.Shs. 9.07 million.

3. During the period under review, Treasury exempted goods for this project from custom and sales tax.

4. Machinery and equipment as per invoices No. 200909 and 200910 shipped on vessel "Split" are expected to be unloaded on 28 February 1983 and they will be transported by railway wagons to MFC Godown Mwanza, which has a storage space of more than 1,500 sq. metres. It has also a railway siding. This will limit possibilities of machinery deterioration even if they are kept for a long time.

5. SIDO has already requested MECO to quote for the fabrication and erection of the foundry, machine shop and civil buildings on prepared foundations.

6. On the basis of 5 above, SIDO consultants Messrs. Tanconsult are preparing civil engineering drawing and retendering is envisaged mid-March.

7. SIDO has received a training report prepared by Mr. A. Karamanoglu of UNIDO Headquarters and accepts the design of the training programme, but it has found some difficulties to recruit the 3 requested metallurgists as Tanzania has very few qualified engineers with that bias. Instead, SIDO is substituting full technician graduate (in mechanical engineering) with 3 years industrial experience.

8. Further to 7 above, SIDO proposes that training should include the type of personnel as in appendix (i). This differs very slightly to UNIDO/Yugoslavia proposal as their proposal did not take into consideration the Mwanza foundry organization structure.

9. SIDO is researching on possible products to be manufactured in the proposed foundry and it is expected that at least enough data will have been collected for commercial products before trainees leave for Yugoslavia. Point 5 of the Quarterly Report No. 1 (SIDO) still holds especially for spare parts.

10. A total of 171 applicants responded to the advertisement for training opportunities for the Mwanza project. About 70 applicants have been shortlisted for interview. This process will be finalized and forwarded to UNIDO for final decision end March.

C. STEPS TO BE TAKEN

(a) Bearing in mind on the foregoing, we have to agree on the revised schedule as reflected in the implementation bar - chart - appendix (ii) i.e.

(i) Building erection - begin April 1983

(ii) Machinery storage - March - January 1984

(iii) Personnel training in Yugoslavia - begin June 1983

(iv) Installation of machinery - begin February 1984

(v) Performance testing - begin April 1984

(vi) Arrival of team leader - begin January 1984.

(b) As the machinery will be kept in a proper working order - Invest-Import should extend machinery guarantee and reschedule the contract to end 30 April 1965.

(c) As stated in earlier occasions, and as stressed further in point 6 of the SIDO Quarterly Report, production bottlenecks are anticipated, as up to date, certain essential complementary equipment, imported raw material, cutting tools and moulding boxes are not included in the contribution from Yugoslavia or in UNDP's country framework. If these two sources cannot be exploited further, we have to look into the possibilities of having these items under a commercial credit. A list of the complementary items (Annex VI), and imported raw material is enclosed as appendix (iii) (b).

APPENDIX (11)

SMALL INDUSTRIES DEVELOPMENT ORGANIZATION

[illegible] FOUNDRY - IMPLEMENTATION BAR-CHART

ACTIVITY	1983 J	F	M	A	M	J	J	A	S	O	N	D	1984 J	F	M	A	M	J	J	A	S	O
1. [illegible] raising funds	xxxx																					
2. [illegible]		xxxxxxxxx																				
3. [illegible]				xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx																		
4. [illegible]	xxxx																					
5. [illegible]			[illegible]																			
6. [illegible]						xxxxxxxxxxxxxxxxxxxxxx																
7. [illegible] of machinery & [illegible]														xxxxxxxxxxxxxx								
8. [illegible]															xxxxxxxxx							
9. Application of I.L. and material order						xxxx																
10. Start up of Production																			xxxxxxxxx			
11. Attainment of Projected Capacity																					xxxx	
12. [illegible] Experts (4)														xxxxxxxxxxxxxxx								
13. Operational [illegible] parts																			xxxxxxxxxx...			
14. Foundry Engineer (Team Leader)												xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx										

Appendix (iii) (b)

List of Essential Imported Raw Materials

		Requirements per Annum
1.	Foundry coke	337,500 kgs.
2.	Gray pig hematite iron	229,500 "
3.	Fe Si lumps 75%	21,870 "
4.	Fe Mn lumps 80%	12,150 "
5.	Fire clay bricks .9 u - 1	14,750 pcs
6.	Fire clay bricks 2 standard	2,560 "
7.	Fire clay flour SA - D	13,350 kgs.
8.	Fire cley concerete "ZVEZDA 1"	1,500 "
9.	Gannister MP - 6	10,000 "
10.	Cast iron bricks - conical SL - 18	12 pcs.
11.	Cast iron bricks standard SL-18	36 "
12.	Water glass $Na_2 SiO_3$	200 kgs.
13.	Cast iron TUYER SL - 18	12 "
14.	Corandum mass EKO	10,000 kgs.
15.	Foundry graphite	3,645 "
16.	P2 melting agent	2,970 "
17.	Steel pipes $\frac{1}{2}$"	600 "
18.	Spirit	6,750 "
19.	Graphite washing	9,500 "

SMALL INDUSTRIES DEVELOPMENT ORGANIZATION

Foundry with Integrated Mechanical Workshop, Mwanza
Tanzania - DP/URT/80/002, Contract No. T-81/101/MK
Quarterly Report No. 1 (SIDO)

Period: November - January, 1983

A. GENERAL

This report covers the stage of implementation of the project in Mwanza. Generally the project implementation especially civil engineering works have been delayed. The report also clarifies several issues raised in Invest-Import Quarterly Reports 1 - 4.

B. ACTIVITIES

1. Complete design of the energetics, installation and equipment erection was submitted to us by Invest-Import.

2. Civil engineering works have been delayed due to shortages of funds allocated to this project from Treasury.

   To save the situation SIDO with instructions from the Ministry of Industries was advised:

   (i) to transfer the foundry to NDC for implementation and

   (ii) to adopt "NECO Design" in a way of saving construction costs.

3. A considerable time was therefore spent in negotiating with NDC and finally the Ministry resolved to return the implementation of the project back to SIDO with equity participation from NDC, SARUJI, SMC, TEXCO and MFC. It is expected that the equity raised from these firms will be used for the construction of the foundry. The Ministry has set end of February, 1983 as a deadline for the submission/commitment of funds to the Ministry.

4. Retendering is therefore envisaged by the end of February and civil construction may begin mid-March, 1983.

5. Due to the inclusion of several parties in the implementation of Mwanza Foundry, the product-mix has to adhere to the interest of several parties i.e. spare parts manufactured have to fit the desire of e.g. NFC - Ginnery parts, TEXCO - Textile, spare parts, SMC - motor car spare parts, NDC - irrigation pump etc. Bearing the above in mind, it is proposed that preparation of technological production documentation and drawings become a continuous excercise i.e. being prepared when the need arises. We had also agreed with "R.Q. Progress" that it was not necessary for SIDO to prepare drawings, sketches or sample products were found enough as a base for "Invest-Import" to prepare technological documentation.

6. Due to lack of foreign currency, it is anticipated that raw materials (imported) which is specified in - specification, balance and parameters of material quality - has to be included in the offers for cutting tools and moulding boxes and negotiations for a commercial credit be initiated. The implementation of this project will depend on the availability of raw materials.

7. Arising from 4 above, it is suggested that training and all other activities be rescheduled accordingly.

8. SIDO is processing import documents for the clearing of goods. Two godowns have already been allocated to SIDO for machinery storage. These godowns have a railway siding so unloading for storage will not cause a problem.

9. The project leader for the implementation of Mwanza Foundry has already been appointed.

C. STEPS TO BE TAKEN

Offers for the commercial agreement for erection, moulding boxes, cutting tools, and start up raw materials as agreed on 25 June 1980 have to be supplied to SIDO and negotiations start immediately. Terms and conditions of credit should be stipulated.

Dar es Salaam, 31 January 1983.

SMALL INDUSTRIES DEVELOPMENT ORGANIZATION.

INVEST-IMPORT - BEOGRAD

Project: Foundry with Integrated Mechanical Workshop, Mwanza, Tanzania, Contract No. T/81/101

Quarterly Report No. 4.

Period: October - December 1982

A. GENERAL

This report covers a stage of implementation of the Project in Mwanza including civil engineering works, supply of equipment and ascertainment of training schedule.

B. ACTIVITIES

1. A complete design of the energetics, installation and equipment erection has been submitted to SIDO. Despite our numerous pressing messages no reply has been received from SIDO regarding the course of the civil engineering works (except their telex message No. 0287/10.09.82 reading as follows: "No progress for civil construction as we want to adopt [illegible] design".

2. From the design organization SIDC received written instructions regarding keeping of the equipment in stores and renewal of agents for protection against corrosion.

3. Offers for cutting tools and moulding boxes, which are not the subject of supply according to the subject Contract, have been prepared to be sent to SIDO.

4. There is no possibility for preparation of technological-production documentation and drawings of necessary tools, since we have not yet received drawings of products for the Foundry and Mechanical Workshop.

5. The UNIDO representative, Mr. [illegible] had talks in Yugoslavia with competent authorities regarding the training of personnel.

6. The complete equipment as per the Contract T/SI/101 as well as the equipment which is granted by the Government of the SFR of Yugoslavia to Tanzania had been cleared through the customs and handed over to the Shipper on 31 December 1982 for irrevocable transport to Tanzania.

7. The invoices No. 200909 and 200910 covering the complete equipment were airmailed to SIDO, UNDP and you on 2nd of December 1982 for preparation of import documents.

8. Pursuant to the Contract conditions, a set of shipping documents has been sent to your address, SIDO and UNDP. The invoices contain exact data about number of packages, weight and volume.

C. STEPS TO BE TAKEN

Procurement of items to be supplied out of SFR of Yugoslavia (moulding machines, laboratory equipment, etc.) and provision of running-in test costs.

Belgrade, 17 January 1983.

INVEST-IMPORT

Suggested Tentative Work Plan

The project will be fully implemented in a period of about 3.5 years, split into the consecutive phases strictly distinguished by the following work plan:

1. Concluding the contract between SIDO and Yugoslav "Invest-Import" - November 1981
2. Preparation of technical data for civil engineering design - until January 1982
3. Awarding of subcontract by SIDO - January/February 1982.
4. Selection of project site - March ~~1982.~~
5. Nomination of the project manager from the SIDO side - December 1982
6. Selection and nomination of the managerial team of the plant by SIDO - ~~May 1983~~
7. Financial provision of the government input (I part) related to civil engineering design, preparation of project site, construction works etc. - ~~May 1983~~
8. Starting in-plant training ~~of the managerial team~~ in Tanzania - ~~July 1983~~.
9. Draft time schedule covering all the preparatory civil and construction works including building erection - ~~May 1983~~
10. Completion of formal, legal, etc. procedures with regard to taking over the project site as a SIDO property - ~~January 1983~~
11. Preparation of the production programme; transfer of documentation from SIDO to Yugoslav sub-contractor - ~~June 1983~~
12. Completion of civil engineering design and related documentation - ~~March 1983~~.
13. Contracting of civil engineering work - ~~April 1983~~.
14. Civil and construction works including building erection - ~~May 1983 to June 1984~~

15.	Transportation and storage of the equipment delivered by the Yugoslav sub-contractor	- March 1983
16.	Procurement of raw materials and delivery to the project site	- December 1984
17.	Arrangement for and delivery of auxiliary tooling (locally made)	- December 1984
18.	Preparation of technological engineering design	- September 1983
19.	Completion of training of Tanzanian personnel in Yugoslavia	- August 1984
20.	Provision of installation materials, elements and tools along with import licences, whenever applicable	- May 1984
21.	Installation of machinery and equipment delivered by the Yugoslav sub-contractor	- September 1984 to February 1985
22.	Performance testing	- January 1985 to November 1985
23.	Starting up of production	- November 1985
24.	Attainment of projected capacity	- November 1986

Annex IV

Annex

for the Tripartite Review Meeting
to be held on 2[illegible] February 1983

YUG/80/022 - Establishment of a Foundry with Integrated Mechanical Workshop

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1. Timely delivery of inputs:

   (a) Government inputs: national staff, project site and date, production programme, civil engineering design, industrial infrastructure, buildings, social facilities, housing, auxiliary tooling and transportation;

   (b) UNDP/UNIDO and Yugoslav inputs: international staff, engineering design, equipment, group training and study tours.

2. Progress in delivery of outputs.

3. Prospects of achieving the project's immediate objectives within the lifetime of the project.

4. Adequacy of project design.

5. Any other business.

6. Conclusions and recommendations.

List of Complementary Equipments for SIDO Foundry - Mwanza

	Quantity	Cost in US$*
1. Optical pyrometer	2	500
2. Moulding machine	4	80,000
3. **Laboratory equipment**		
(a) **Chemical Section**		
Gas and volumetric determination of sands	1	5,000
Automatic analytical balance 100 gr.	1	500
Metalographic microscope	1	16,000
" testing device and accessory	1	5,000
(b) **Sand Testing Section**		
Automatic balance 100 gr.	1	500
Infra-ray dryer type PIT	1	300
Permeability tester type PFD	1	1,500
Ramming PRA	1	500
Sieves PSA	1	1,000
Mixer PWB	1	6,000
Hardness tester with accessories	1	10,000
Teno meter PFH	1	15,000
4. Pattern making equipment		80,000
5. Laboratory glasses, spare parts and accessories		20,000
6. Light delivery truck - $3\frac{1}{2}$ ton		40,000
7. Special machinery and tools for the machine-shop (subject to further specification and formulation of the production programme)		70,000
8. Diesel generator	1	40,000
9. Microbus	1	24,200
Total		US$ 400,000

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* Based on the international prices quoted in 1982.

Tanzania Government Budget

(in '000 Shs.)

		1983	1984	
1.	Building and infrastructure	13,370	10,574	
2.	Wharfage, clearing and port handling	395		
3.	Transportation to Mwanza	394		
4.	Insurance	158		
5.	Civil consultancy	650		
6.	Local cost of trainees while in Yugoslavia	248		
7.	Provision of energetics	650		
8.	Working capital		4,000	
9.	Local cost of experts		1,073	
10.	Furniture and fittings		350	
11.	Cost of erection		500	
12.	Contingencies		651	
		16,506	17,148	
	Total			33,654

Schedule of Training Personnel

A. Management Personnel

1.	Co-ordination (plant manager)	1 x 6 months
2.	Foundry Engineer	1 x 6 "
3.	Machining shop Engineer	1 x 6 "
4.	Production Planning Engineer	1 x 6 "
5.	Laboratory Chief	1 x 6 "
6.	Planning Engineer (tools and materials)	1 x 6 "
7.	Quality Controller Chief	1 x 6 "

B. Production Personnel

8.	Melting work Foreman	1 x 6 "
9.	Moulding shop Foreman	1 x 6 "
10.	Cleaning shop Foreman	1 x 6 "
11.	Machine shop Foreman	1 x 6 "
12.	Laboratory Technician	1 x 6 "
13.	Pattern Maker	1 x 6 "
14.	Maintenance (mechanical)	1 x 6 "
15.	Maintenance (electrical)	1 x 6 "

ENCLOSURE No. 3

TAKE (HAND) - OVER CERTIFICATE

CONTRACT: No.T81/101

PROJECT: No.DP/URT/80/022

PROJECT TITLE: FOUNDRY WITH INTEGRATED MECHANICAL WORKSHOP AT MWANZA, TANZANIA.

MWANZA, 22/07/86.

CONTENTS:

Hand-over/take - over Certificate

This is to certify:

1. That the equipment for a Foundry and Integrated Mechanical Workshop at Mwanza, Tanzania designed for an annual capacity of 1ooo - 13oo tons of ferrous and non-ferrous castings responding fully to the contractor's technical and cost proposal has been delivered to the project site brand new of the first class matrials and workmanship. Corresponding technical documentation has also been handed over (attachment No. 1).

2. That the equipment supplied has been installed in accordance with the high professional standards.

3. That the equipment supplied and installed has been cold tested on 21/22.o7.86. and satisfactorily fulfilled required functioning. The list of the equipment cold tested and shown to be fully operational (each unit with main items) is enclosed to this certificate as the attachments No. 2. as the integral part thereof.

4. Performance tests of the equipment and machinery installed shall be carried out in compliance with the contract (para 6.1o and 6.11) as soon as raw materials, complementary equipment (moulding machines /2 pairs/ and part of the laboratory equipment) and tools are available at the project site, but not later than October, 1986.

5. Commissioning of the plant will be carried out for a period needed to show the equipment installed to be fully operational and projected capacity attained, provided that the costs related to the trial operation are covered and the terms and conditions thereof agreed.

On behalf of
Invest-Import

By: .....
D. STOJANOVIC

On behalf of UNIDO

By: .....
KIKUCHI

Witnessed By:

SIDO -
NEPCO — Maua Mfalimbega
P. J. Ifunya
W. Wansakya

LZT - RO PROGRESS - S. Matejic
A. Konecni

Done at Mwanza on 22.07.1986

ATTACHMENT NO. 1

E 1)	MILLING MACHINE	- E
2)	PEDESTAL GRINDER (DOUBLE WHEEL)	- Y
3)	SPINDLE GRINDING WHEELS	- Y
4)	SHARPENER (DOUBLE WHEELS)	- Y
5)	SHOT BLASTING MACHINE (WHEELABRATOR)	- Y
6)	SHAKE OUT GRID	- Y
7)	AIR COMPRESSOR	- E&Y
8)	MAGNETIC SEPARATOR	- Y
9)	ALUMINIUM FURNACE	- E
1o)	OVERHEAD TRAVELING CRANE	- Y
11)	SAND MIXER (MULLER) ELECTRICAL DRAWING M/C	- Y
12)	CORE SAND MIXER	- Y
13)	SAND DOZING BELT	- S
14)	DUST COLLECTION BLOWERS & CYCLONES OPERATION CHARACTERISTICS, EFFICIENCY, ETC.	- E
15)	CHARACTERISTICS OF RUBBER CONVEYOR BELT	- S + E
16)	HANGING SUSPENDED GRINDER	- Y
17)	DRYING TORCH/BURNER	- S + E
18)	PNEUMATIC CHISEL	- Y
19)	PNEUMATIC RAMMER	
2o)	POLYGONAL SIEVE (SEPARATOR)	- SL
21)	POURING LADLE - o,5 TONS	- S
22)	LADLES 75o & 2oo kg.	- E
23)	FORK LIFT - POBEDA	- E + Y
24)	COPIES FOR CABINET DESIGN -- 3 PCS	
25)	POURING LADLE LIFT DEVICE	- S
26)	RADIAL DRILLING MACHINE	- E
27)	LATHE MACHINE	- E
28)	INDUSTRIAL SCALE	- S
29)	INDUSTRIAL SCALE	- S
3o)	ALL POWER PANELS AND SUB-PANELS	
31)	REDUCER DRUMS (REDUCTION GEAR) AND ROLLERS	- S + E

ATTACHMENT NO. 2.

1.00 MELTING UNIT

ITEM	DESIGNATION	QTY
1.	CUPOLA FURNACE	2 pcs.
2.	CHARGING SKIP	1 pc.
3.	CUPOLA FAN (BLOWER)	1 pc.
4.	RECEIVER	1 pc.
5.	OIL BURNER	2 pcs.
6.	OIL TANK WITH PIPE LINE	1 set
7.	INDUSTRIAL SCALE	1 pc.
8.	POURING LADLE 25o kg.	4 pcs.
9.	POURING LADLE 75o kg.	1 pc.
1o.	POURING LADLE 7o kg.	2 pcs.
11.	POURING LADLE LIFT DEVICE	3 pcs.
12.	ALUMINIUM MELTING FURNACE	1 pc.
13.	OIL TANK WITH PIPELINE	1 set
14.	POURING MONORAIL	1 set

2.00. MOULDING UNIT

ITEM	DESIGNATION	QTY
1.	ROLLER CONVEYERS	2 sets
2.	SHAKE OUT GRID	1 pc.
3.	OVERHEAD TRAVELLING CRANE	1 pc.

3.00. SAND PREPARATION AND CORE MAKING UNITS

ITEM	DESIGNATION	QTY
1.	MOULDING SAND MIXER WITH DOZING EQUIPMENT	1 set
2.	CORE SAND MIXER	1 set
3.	POLYGONAL SIEVE	1 set
4.	CYCLON	1 pc.
5.	HOPPER ASSEMBLY WITH PLATFORM CARRYING CONSTRUCTION FOR STORING OF SAND ADDITIVE AND MOULDING SAND	1 set
6.	MOULDING SAND BELT COVEYER	1 TRANSPORT LINE
7.	RETURN SAND BELT CONVEYER	1 TRANSPORT LINE
8.	MAGNETIC SEPARATOR	1 pc.
9.	ADDITIVE AND NEW - SAND HOIST WITH SEPARATOR	1 set
10.	PNEUMATIC VIBRATING SIEVE	1 set
11.	CORE MAKING BENCH	2 pcs.
12.	CO_2 - PIPE LINE	1 set
13.	WATER TANK Noo 1. WITH PIPE LINE	1 set

4.00 CLEANING UNIT

ITEM	DESIGNATION	QTY
1.	WHEELABRATOR UNIT WITH CYCLON	1 set
2.	PIEDESTAL TWO - SIDE GRINDER	1 pc.
3.	SWING TYPE GRINDER	1 pc.
4.	WORKING BENCH	4 pcs.

5.00 INSPECTION UNIT

ITEM	DESIGNATION	QTY
1.	PIEDESTAL TWO-SIDE GRINDER	1 pc.
2.	CONTROL MEASURING INSPECTION DESK	1 pc.
3.	SMITHS` WORKING BENCH	2 pcs.
4.	HAND OPERATED EL.DRILL	1 pc.

6.00 DUST CCLLECTING UNIT

ITEM	DESIGNATION	QTY
1.	DUST COLLECTOR WITH FAN	1 set
2.	DUST CCLLECTING PIPELINE	

7.00 COMPRESSED - AIR STATION

ITEM	DESIGNATION	QTY
1.	AIR COMPRESSOR CENERATING SET	1 set
2.	COMPRESSED - AIR TANK 10 m^3	1 set
3.	COMPRESSED - AIR PIPELINE	1 set

8.00 MACHINING UNIT

ITEM	DESIGNATION	QTY
1.	UNIVERSAL LATHE	2 pcs.
2.	UNIVERSAL MILLING MACHINE	1 pc.
3.	RADIAL DRILLING MACHINE	1 pc.
4.	EL. WELDING EQUIPMENT	1 set
5.	SMITHS` WORKING BENCH	6 set
6.	PEDESTAL TWO-SIDE GRINDER	1 pc.
7.	AUTOGENOUS WELDING SET	1 set
8.	SINGLE METAL CABINETS FOR TOOLS	4 pcs.
9.	STEEL VICE	7 pcs.

9.00. TRANSPORT FACILITIES:

ITEM	DESIGNATION	QTY
1.	FORK LIFT	2 pcs.
2.	TILTING CART	6 pcs.
3.	TURTLE - CART	2 pcs.
4.	TRANSPORT STORAGE CASE	25 pcs.
5.	PALLETTES	3 pcs.
6.	CORE RACK 30 m^2	4 pcs.

ENCLOSURE No. 4

COMPARISON OF CONTRACTED AND SPENT
MAN/MONTHS

No.	Man/months	Contracted	Really spent
1.	Home office		
	- substantial services	26	49
	- administrative and clerical services	69	66
2.	In the project area	37	52
	TOTAL MAN/MONTHS:	132	167

ENCLOSURE No. 5

LIST OF NECESSARY MATERIAL WHICH IS PROCURED
OUT OF THE SUBCONTRACT

ITEM		QTY	TECHNICAL DATA	COST IN US$
1.	Contactor	11 pcs	CN 160	180,00
2.	Bimetal	6 pcs	RB-40 (6-12A)	106,00
3.	Work-hour timer	2 pcs	-	80,00
4.	Breaker	6 pcs	KR 1-1	55,00
5.	PInion switch	4 pcs	4G-40-10 U	42,00
6.	Magnet diode with cooler	8 pcs	DOO-100R-10	1.088 ,00
7.	Switch taster	4 pcs	with 2 buttons	25,00
8.	Relay	1 pc	PR - 59 C	24,00
9.	Relay base	1 pc	-	6,00
10.	Stop switch taster	3 pcs	-	20,00
11.	Lamp	8 pcs	SS - 30	21,00
12.	Housing switch (left-right)	1 pc	4G-16-1'-PK	15,00
13.	Magnet indicator	5 pcs	-	14,00
14.	Timing relay	5 pcs	CRT 0-600S	530,00
15.	Brake shoe	1 pc	"Veda" hoist	39,00
16.	Brake adjusting equipment	1 pc	-	56,00
17.	OIL burner flame keeper	1 pc	Satronic 701-1 TF	38,00
18.	RE. magn.valve for compressor	1 pc	-	53,00
19.	Screw die	1 set	3,4,5,6,8,10 mm	114,00
20.	Screw drill	1 set	3,4,5,6,8,10 mm	247,00
21.	Compressor joint	1 set	-	139,00
22.	V - belt	2 pcs	13 x 1100 (mm)	2,00
23.	Crane rubber rollers	30 pcs	-	52,00
24.	T joint	2 pcs	2 x 16/10	112,00
25.	Plastic tube and clamp	8 pcs	3m, 10, 16 mm DIA	2,00
		T O T A L =		3.060,00

ENCLOSURE No. 6

COMPLEMENTARY EQUIPMENT

	Cost in US$
1. Optical pyrometar, 1100-1600°C.....	600,00
2. Moulding machine 2 pairs, semi-mechanized.....	80.000,00
3. Gas and volumetric determination of C and S content, one set.....	10.000,00
4. Automatic analytical balance, 100 g, 2 pcs.....	5.000,00
5. Metalographic microscope.....	9.000,00
6. Metalographic testing device with accessory.....	5.000,00
7. Infra-ray dryer	1.000,00
8. Laboratory mixer.....	4.350,00
9. Sieve, set.....	1.850,00
10. Ramming.....	1.700,00
11. Permeability tester	1.500,00
12. Sand hardness tester.....	5.050,00
13. Tonometer.....	150,00
14. Hardness tester with accessory.....	5.000,00
15. Grinding and polishing machine.....	6.000,00
16. Drilling machine.....	2.500,00
T O T A L US$	138.700,00

ENCLOSURE No. 7

RAW MATERIAL FOR START-UP PRODUCTION

RAW MATERIAL SUPPLIED TO NEFCO FOUNDRY

No.	Description	QFY kgs	Unit price US$	TOTAL US$
1.	Foundry coke	190.000	0,10	19.000,00
2.	Grey pig iron	140.000	0,25	35.000,00
3.	Fireclay concrete	1.200	0,25	300,00
4.	Ganister, MP-6	7.000	0,05	350,00
5.	Bentonite	56.000	0,10	5.600,00
6.	Steel shot	19.000	0,50	9.500,00
7.	Slag coagulant, PZ	1.500	0,22	330,00
8.	Steel for chipping tools	90	1,20	108,00
9.	Moulding box	pcs		
	562x440x180 (mm)	100	82,00	8.200,00
	562x440x140 (mm)	100	74,00	7.400,00
10.	Condensed water collecter	4	23,65	94,60
11.	Manifold 1/2"	13	29,90	388,70
	3/4"	2	29,90	59,80
	3/8"	4	29,90	119,60
	Total FOB Rijeka US$			86.450,70
	Freight	"		42.650,30
	TOTAL C & F Dar es Salaam US$			129.101,00

LIST OF REST OF RAW MATERIAL FOR START-UP PRODUCTION

No	D e s c r i p t i onn		Quantity	Unit price US$	Total price US$
1	2		3	4	5
1.	Ferrosilicon bricks	kos	9,000	0,705	6.345,00
2.	Ferrosilicon granulated	"	500	1,07	535,00
3.	Ferromanganese bricks	"	6,000	0,554	3,324,00
4.	Fireclay bricks, KU-1	pcs	780	1,67	1,302,60
5.	Fireclay bricks, st.-2	"	1,600	0,771	1,233,60
6.	Fireclay bricks N_2 porit	"	800	1,800	1,440,00
7.	Fireclay flour SA-0	kos	2,000	0,122	244,00
8.	Corundum mass, plistic VKA	"	5,000	0,65	3,250,00
9.	Foundry graphite "	"	600	0,80	480,00
10.	Petrol coke	"	1,000	0,52	520,00
11.	Steel pipes 1/2"	"	2,000	1,65	3,300,00
12.	Parting powder	"	100	2,42	242,00
13.	Bentocarsin	"	15,000	0,437	6,555,00
14.	Micrometar 0-25 (mm)	pcs	1	62,00	62,00
	25-50 "	"	1	65,00	65,00
	50-75 "	"	1	76,00	76,00
	75-100 "	"	1	97,27	97,27
15.	Adapter, boring m/c, 4/2	"	2	11,35	22,70
16.	High precision dial calliper 0,01 mm, 150 mm ISO	"	2	26,00	52,00
17.	Lathe tool ISO-2 16x16	pcs	1	4,00	4,00
	20x20	"	1	4,60	4,60
	25x25	"	1	8,60	8,60
	ISO-7 20x12	"	1	4,00	4,00
	25x16	"	1	6,00	6,00
	ISO-8 10x10	"	5	1,80	9,00
	16x16	"	5	4,00	20,00
18.	Lathe bent tool ISO-2 12x12	"	1	2,40	2,40
19.	Lathe hole tool ISO-9 8x8	"	3	1,40	4,20
	" 25x25	"	5	10,20	51,00

1	2		3	4	5
20.	Lathe thin tool ISO-13 20x10	pcs	1	18,00	18,00
21.	Lathe centres MK-4				
	" dead 60 grad.	"	2	15,00	30,00
	" revolving 60 grad.	"	2	80,00	160,00
22.	Soft jaws 200/3, MK-4 lathe m/c		2	50,00	100,00
23.	Milling G-030, DIA 50				
	cutter	pcs	6	27,30	163,80
	" " 63	"	6	28,80	172,80
	" " 100	"	6	56,40	338,40
	" " 50	"	6	25,80	154,80
	G-138, DIA 12,5	"	3	12,50	37,50
	" " 14,5	"	3	13.10	39,30
	G-144 " 24,5	"	3	20,00	60,00
	G-070, DTA 63x20x16°	pcs	5	30,00	150,00
	G-072 DIA 63x18x75°	"	4	26.00	104,00
	G-070 DIA 80x25x55°	"	2	48,00	96.00
	G-070 DIA 40x13x55°	"	5	14,00	70.00
	DTA 100x32x55°	"	3	85,00	255,00
	G-074 DIA 80x9x30°	"	2	29,00	58,00
	R - 5. DIA 63 x 20	"	3	34,50	103,50
	G-081 DTA 100x24 R123	"	3	67,00	201,00
23 A.	Hand Screw Die				
	M4, M5, M6, M8, M10	"	10	2.65	26,50
	M12, M16, M18, M20	"	4	3,725	14.90
	Die Holder	"	3	5,50	16,50
24.	M/c screw dia 2"	pcs	1	44,00	44,00
25.	Hand scraw tap M4	set	2	3,70	7,40
	M5	"	2	3,85	7,70
	M6	"	2	4,00	8,00
	M8	"	2	4,80	9,60
	M10	"	2	5,65	11,30
	M12	"	1	7,30	7,30
	M16	"	1	9,90	9,90
	M18	"	2	12,50	25,00
	M20	"	1	14,40	14,40

1	2		3	4	5
26.	Hand scraw tap holder	pcs	2	2,70	5,40
27.	Combined drill, DIA 2,5	"	5	2,00	10,00
28.	Quick change chuck boring m/c MN	"	1	89,00	89,00
29.	Twist drill, MK. DIA 3,0	"	6	3,00	18.00
	" 3,5	"	6	3,00	18,00
	" 4.0	"	6	2,60	15,60
	" 4,5	"	6	2,60	15,60
	" 5,1	"	6	2,60	15.60
	" 5,5	"	6	2,60	15,60
	" 6,5	"	6	2,60	15,60
	" 7,0	"	6	2,70	16,20
	" 7,5	"	6	2,70	16,20
	" 8,0	"	6	2,70	16,20
	" 8,5	"	6	2.80	16,80
	" 9,0	"	6	2,80	16,80
	" 10,0	"	6	2,90	17,40
	" 11,1	"	4	3.20	12,80
	" 12,1	"	4	3.90	15,60
	" 13,9	"	4	5,20	20,80
	" 15.2	"	4	6,60	26,40
	" 16,0	"	4	6,80	27,20
	" 18,0	"	4	7,90	31,60
	" 20,2	"	5	11,60	58.00
	" 25,2	"	4	20.70	82,80
	" 30,0	"	3	31,00	93,00
30.	Rezoflex, angle grinder m/c 178x6x22 (mm)	"	200	1,30	260,00
31.	Grinding wheel, 450x50x150 (mm)	"	64	19,40	1,241,60
	100x20x20 (mm)	"	80	2,50	200.00
	250x25x25	"	4	7,35	29.40
	400x40x45	"	20	23.80	476.00
	250x32x25	"	8	7,25	58.00

1	2	3		4	5
32.	Section grinder 12/3	pcs	50	0,60	30,00
	25/6	"	150	0,60	90,00
	30x 15/6	"	40	0,30	12,00
33.	Asbestos sheet 4x1000x1000 (mm)	"	80	23,75	1,900,00
34.	Al-Si scrap	kos	500	1,00	500,00
35.	Protective salt, RAL	"	40	0,25	10,00
36.	Degazator	"	5	1,70	8,50
37.	Graphite washing	"	2000	1820	3,640,00
38.	Fork lift type, 560x165x11	"	8	70,00	560,000
39.	Fork lift tube "	"	8	8,00	64,00
40.	Rear fork lift wheel with type	set	4	210,00	840,00
41.	Dimensional measurement	"	1	474,10	474,10
42.	Foundrymen Protective Equip.	"	4	150.00	600,00
		TOTAL FOB.....USD 43,454,37			
		Freight.....USD 7,443,70			
	TOTAL C and F Dar es Salaam				USD 50,898,07

ENCLOSURE No. 8

LIST OF LOCALLY AVAILABLE MATERIAL

1. Liquid oxygen	600 kgs
2. Fuel oil	2000 lit
3. Quartz sand	800 t
4. Liquid CO_2	10 t
5. Petroleum	200 lit
6. Machine oil, HD 30-50	100 lit
7. Steel scrap	400 t
8. Lime stone ($CaCO_3$)	100 t
9. Asbestos glove	7 pairs
10. Worker`s clothes	108 sets
11. Protective glove	108 pairs
12. Worker`s shoes	98 pairs
13. Protective apron	30 pcs
14. Eye protector	18 pcs
15. Leg protector	10 pairs
16. Protective helmet	5 pcs
17. Working coats	7 pcs
18. Shovel	20 pcs
19. Bucket, 10 lit	10 pcs
20. Bucket, 3 lit	10 pcs
21. Flask pallet, 800x600 (mm)	60 pcs
22. Brush	2 pcs
23. Core pallet, 600x400x3 (mm)	100 pcs
24. Old grey iron parts	300 t
25. Coal dust	25 t

ENCLOSURE No. 9

LIST OF EXTRA WORKS WHICH WERE IMPLEMENTED BUT NOT CONTRACTED

LIST OF EXTRA WORKS:

A. HOME OFFICE

A.1. Substantial services

Additional 23 man/months were spent for extra works due to change of location and size and shape of building, i.e.:

A.1.1. 13,5 man/months.....For modification an adaption of the overall design documentation to the size and shape of the new building (Godown) as well as to the new requirements of industrial infrastructure at project site:

- technological and engineering design,
- assembly documentation,
- energy and utilities design along with specification of installation material modified twice at SIDO's request,
- new drawings for laboratory and mechanical workshop due to consecutive change in location of the equipment recommended by SIDO.

A.1.2. 1,0 man/months.....For modification of design for compressor station and raw material boxes in order to reduce the costs in civil works as well as to minimize the use of construction materi al. All made at SIDO's request.

A.1.3. 1,5 man/months.....For electrical documentation required to build up the transformer station prepared at SIDO's request.

A.1.4. 1,0 man/months.....For selection and specification of installation tools and implements, later modified at SIDO's request.

A.1.5. 6,0 man/months..... For complementary technological documentation for diversified production programme recommended and requested by NEFCO, associated with Nyanza Farmers Cooperative UNIT (Ginnery parts). Set of drawings includes drawings of final piece, casting, pattern, core box and gating system.

B. IN THE PROJECT AREA

B.1. Additional 15 man/months were spent for extra works in the project area for the reconstruction and adjusting of equipment, i.e.:

B.1.1. 4,5 man/months..... For Sand processing plant (total weight about 36 t):

- Redesigning supporting columns, staircase, platforms, fans, conveyors etc.,
- Reconstruction of the above items and adaption of the actual size of the building,
- Supervisory services.

B.1.2. 3,5 man/months..... For dust collector pipeline systems, one for sand procesing plant, the other for the cleaning and fettling section:

- Redesigning of two pipeline systems (total weight about 12 t and lenght 105 m):
  - Manufacturing of redesigned fittings,
  - Reconstruction of the two systems through installation of additional pipes, fittings and bends,
  - Supervisory services.

B.1.3. 3,0 man/months..... For Melting section (total weight about 25 t):
- Recalculation of the thermal efficiency of the cupola and other related factors, such as coke/air ratio, refractory lining consumption, temperature zones, reduction of preheating section etc.,
- Redesigning of the two cupola furnaces required to be adjusted to the building height,
- Reconstruction of the melting stand including: cupolas, supporting structure, chimney, monorails with two new columns and skip with metal charging system,
- Supervisory services.

B.1.4. 3,0 man/months ..... For detailed checking and inventory of equipment delivered to project site.
Leaving the equipment in the stores for a long time (over 2 years)required much more time and work for the checking, cleaning, repair and change of damaged parts:
- Testing of all electric motors, devices, el distribution cabinets, etc. Along with cleaning, drying and lubricating whichever necessary in recognized tropical conditions prevailing in Mwanza,
- Replacment of the damaged motors and other electric installation,
- Supervisory services.

B.1.5. 0,5 man/months..... For refractory materials:
- Collecting samples of the refractory material stored at project site,

- Arranging the transportation of samples to the foundry laboratory at Kikinda-plant,
- Analysis of the refractory bricks and synthetic quartz lining for the cupola.

B.1.6. 0,5 man/monts..... For other extra activities:

- Cleaning of corroded parts and protection with relevant coating etc.

C. Transportation and travel

The increased numbers of travelling (21 instead contracted 12) and stayng on site were necessary for choosing the location, checking the building and foundations, analyses of the possibilities of supply of necessary power, tools and material.

PROFESSIONAL SERVICES COSTS

No. Man/months	Contracted			Implemented			Difference	
	m/m	US$/m-m	Total US$	m/m	US$/m-m	Total US$	m/m	US$
1. Home office - substantial services	26	1.538,46	40.000,00	49	1.538,46	75.384,00	+23	+ 35.384,00
- administrative and clerical services	69	348,55	24.050,00	66	348,55	23.000,00	- 3	- 1.050,00
2. In the project area	37	4.503,75	166.639,00	52	4.503,75	234.195,00	+15	+ 67.566,00
T o t a l I	132	-	230.689,00	167	-	332.579,00	+35	+101.890,00

Other costs	No.of trav.	US$ / trav.	Total US$	No.of trav.	US$ / trav.	Total US$	
1. Transportation and travel	12	2.271,75	27.261,00	21	2.271,75	47.780,00	+ 20.439,00
2. Briefing	3	650,00	1.950,00	3	650,00	1.950,00	
T o t a l II	-	-	29.211,00	-	-	49.650,00	+ 20.439,00
TOTAL I + II	-	-	259.900,00	.	-	382.229,00	+122.329,00

ENCLOSURE No. 10

LIST OF TECHNOLOGICAL DOCUMENTATION FOR THE SELECTED PRODUCTION PROGRAMME ITEMS

Item		Title	Description
1.	Charcoal	- body	set of Drawings
		- top cover	" "
2.	Sewage pipe	- soil pipe	" "
3.	Sewage fittings	- cros joint with door	" "
		- S - trap	" "
		- T - joint	" "
		- Y - joint	" "
		- P - trap	" "
		- socket	" "
		- Nahani trap	" "
		- Ventilation cover	" "
4.	Highlevel cistren	- tank	" "
		- cover	" "
		- siphon pipe cover	" "
		- siphon pipe	" "
		- lever arm	" "
5.	Manhole cover 16x16"	- cover	" "
		- frame	" "
6.	Bench vice 100	- slipper	" "
		- body	" "

Note: Set of drawings includes following drawings of:

- casting
- patern
- core box and
- ingating system.

List of tehnological documentation for foundry tools, pattern plates, moulding boxes etc :

Item	Title	Description
1.	Pattern plate	630x500 x50 (mm)
2.	Guide pin	IS. LK - 19
3.	Moulding flask	562x440x188/140 (mm)
4.	Flask pin	IS. LK - 30
5.	Pouring basin - set	IS. LK - 6
	- body	-"-
	- pin	-"-
	- spring	-"-
	-srew	-"-
6.	Cylindrical busning	IS . LK - 23
7.	Extension bushing	IS . LK - 24

List of complementary technological documentation of foundry tools (Ginnery parts) :

Item	Title	Description
1.	Arm lever	set of Drawings
2.	Arm bracket	" "
3.	Coupling (upper parts)	" "
4.	Coupling (lower parts)	" "
5.	Sliding bracket	" "
6.	Sliding plate (2)	" "
7.	Sliding plate (1)	" "

Note: Set of drawings includes following drawings of:

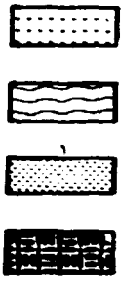
- final piece,
- casting,
- pattern,
- core box and
- ingating system.

ENCLOSURE No. 11

TRAINING PROGRAMME

TRAINING PLAN PROPOSAL

LEGEND:



Raw materials preparation

Melting shop

Moulding shop

Core room

SECTION 1

WORKERS from TANZANIA			1st MONTH																														
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27				
MANAGING	1	FOUNDRY MANAGER																															
	2	MAIN FOUNDRY ENGINEER (PLANT MANAGER)																															
	3	MAIN ENG.OF THE MACH. PLANT(machine shop manager)																															
	4	LABORATORY CHIEF																															
	5	FOUNDRY TECHNOLOGIST																															
	6	MACHINE SHOP TECHNOLOGIST																															
	7	QUALITY CONTROL CHIEF																															
PRODUCTION	8	MELTING SHOP FOREMAN																															
	9	MOULDING SHOP FOREMAN																															
	10	CLEANING SHOP FOREMAN																															
	11	MACHINE SHOP FOREMAN																															
	12	LABORATORY TECHNICIAN																															
	13	PATTERN MAKER																															
	14	MACHINE-MAINTENANCE FOREMAN																															
		ELECIRO-MAINTENANCE																															

Introducing with foundry L2T, Kikinda

"-"-

Introducing with Mwanza foundry project

Technical preparation of casting production

Foundry raw materials prepgration

Foundry equipment start-up preparation

Melting devices

Moulding and other devices

Melting practice

Core making practice

Moulding sand preparation

Mouiding practice

Pouring practice

Production parameters checking

Cleaning and quality control of castings

Laboratory testing

Carbon content analysis

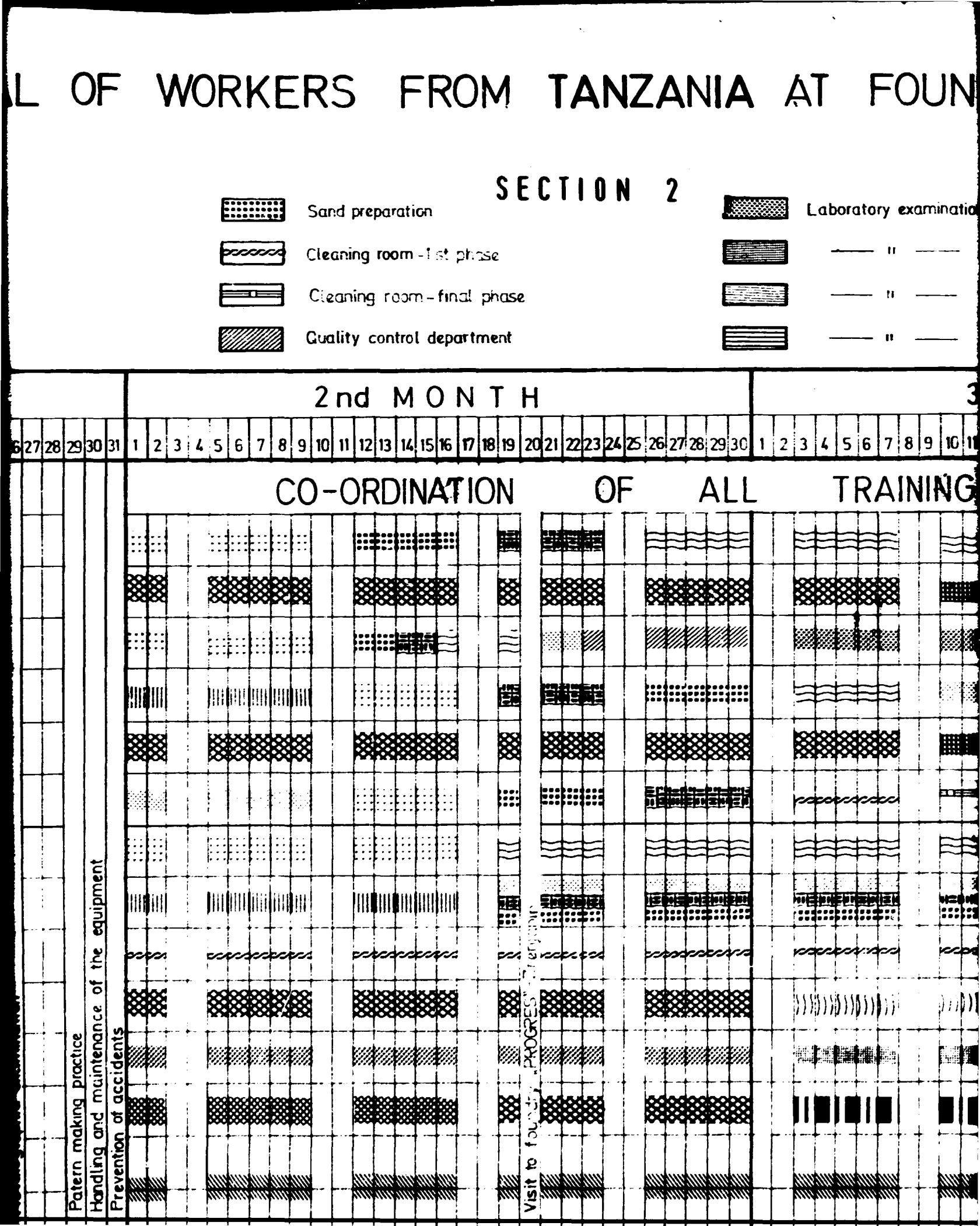
Sulphur content analysis

Moulding sand testing

Metalographic examination

L OF WORKERS FROM TANZANIA AT FOUN

SECTION 2



UNDRY IN SOUR LŽT "KIKINDA" - KIKINDA,

SECTION 3

minations: chemicals
metalographical
mechanical
moulding sand

Foundry technology department
Production planning department
Pattern designing department
Machine technology department

Wooden
Metal p
Machin
Mainte

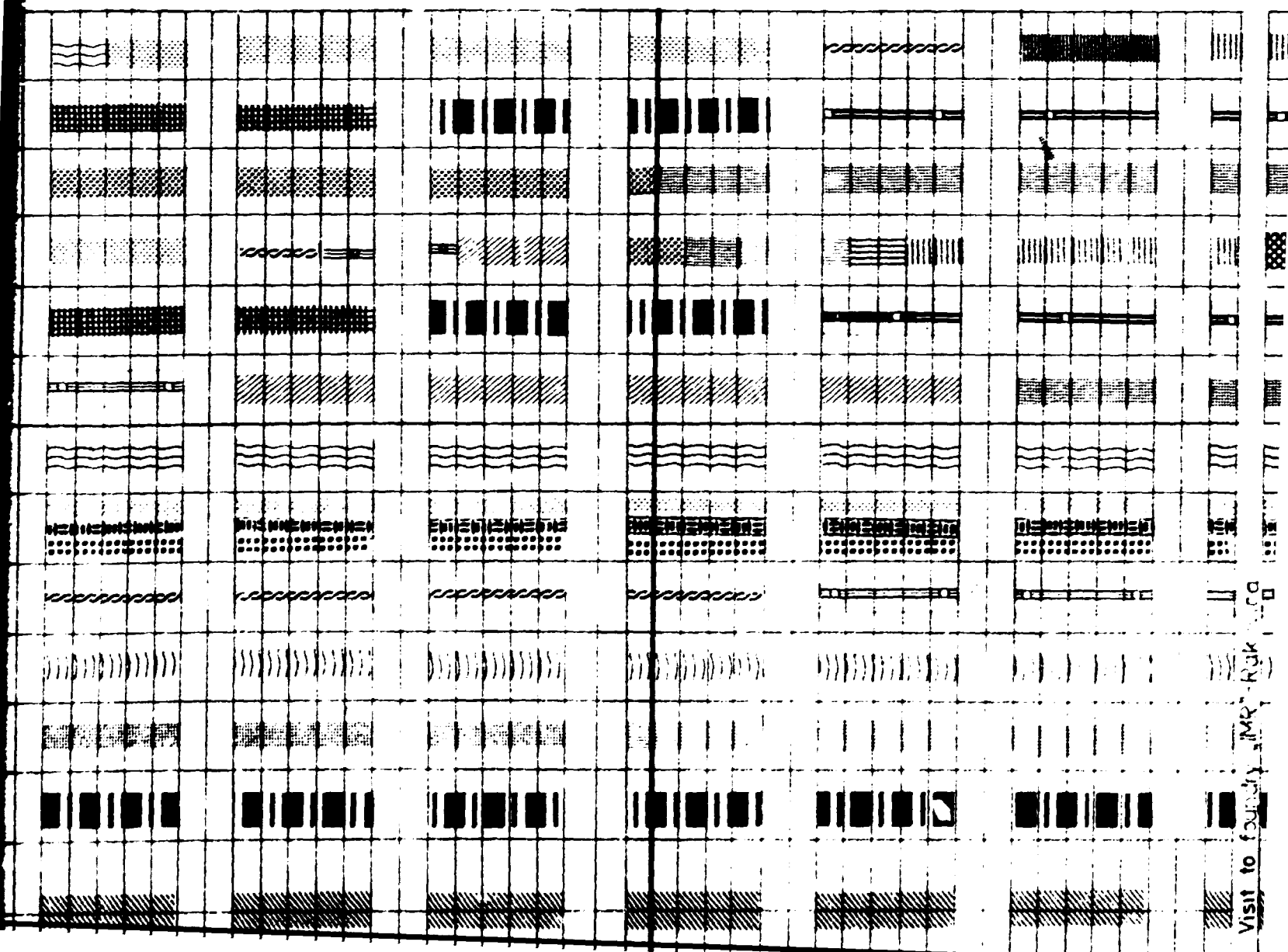
3rd MONTH

9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

4th MONTH

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

ING ACTIVITIES



A, YUGOSLAVIA

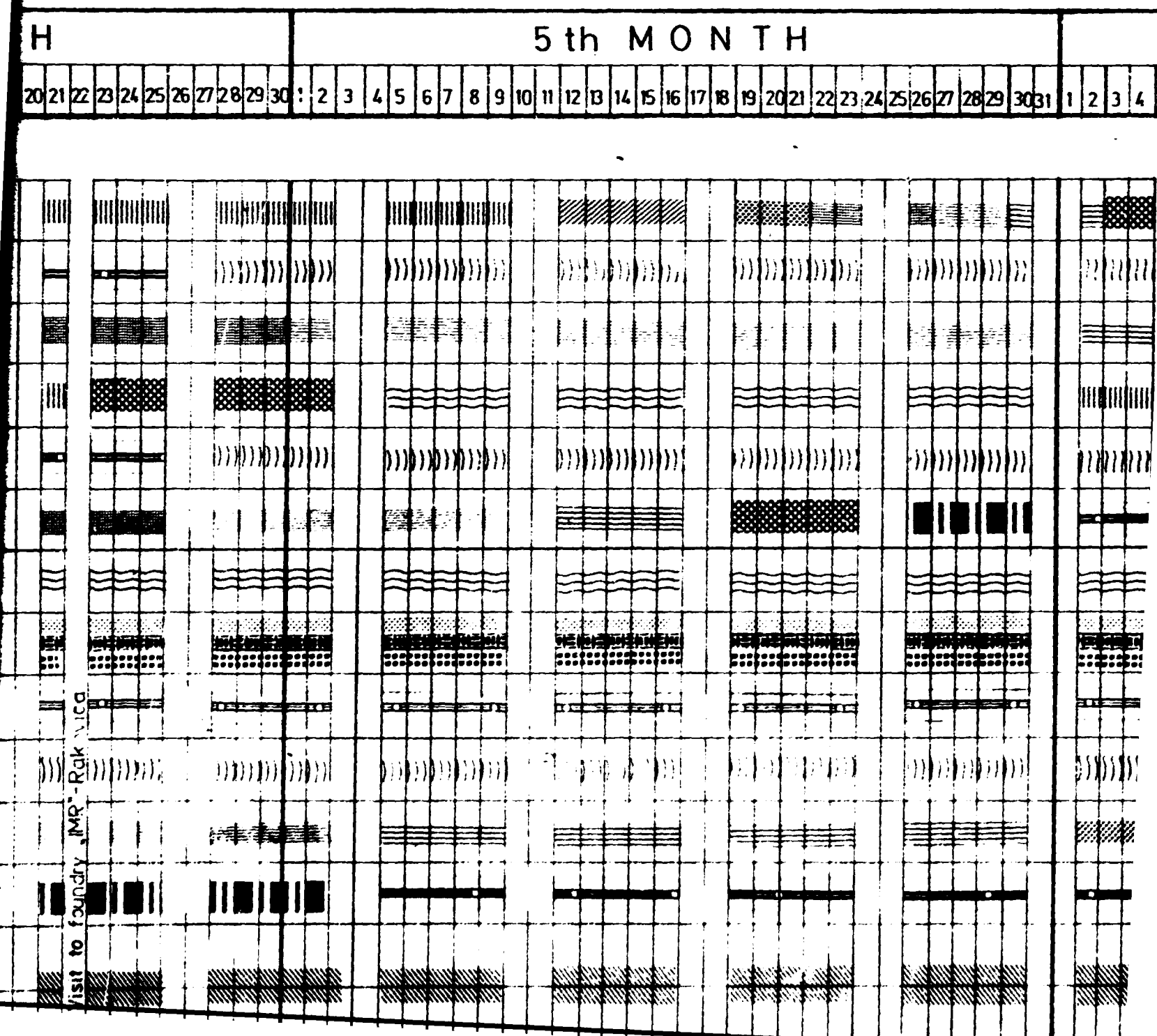
Wooden pattern making shop

Metal pattern making shop

Machining plant

Maintenance department

SECTION 4



15 th MARCH, '984

SECTION 5