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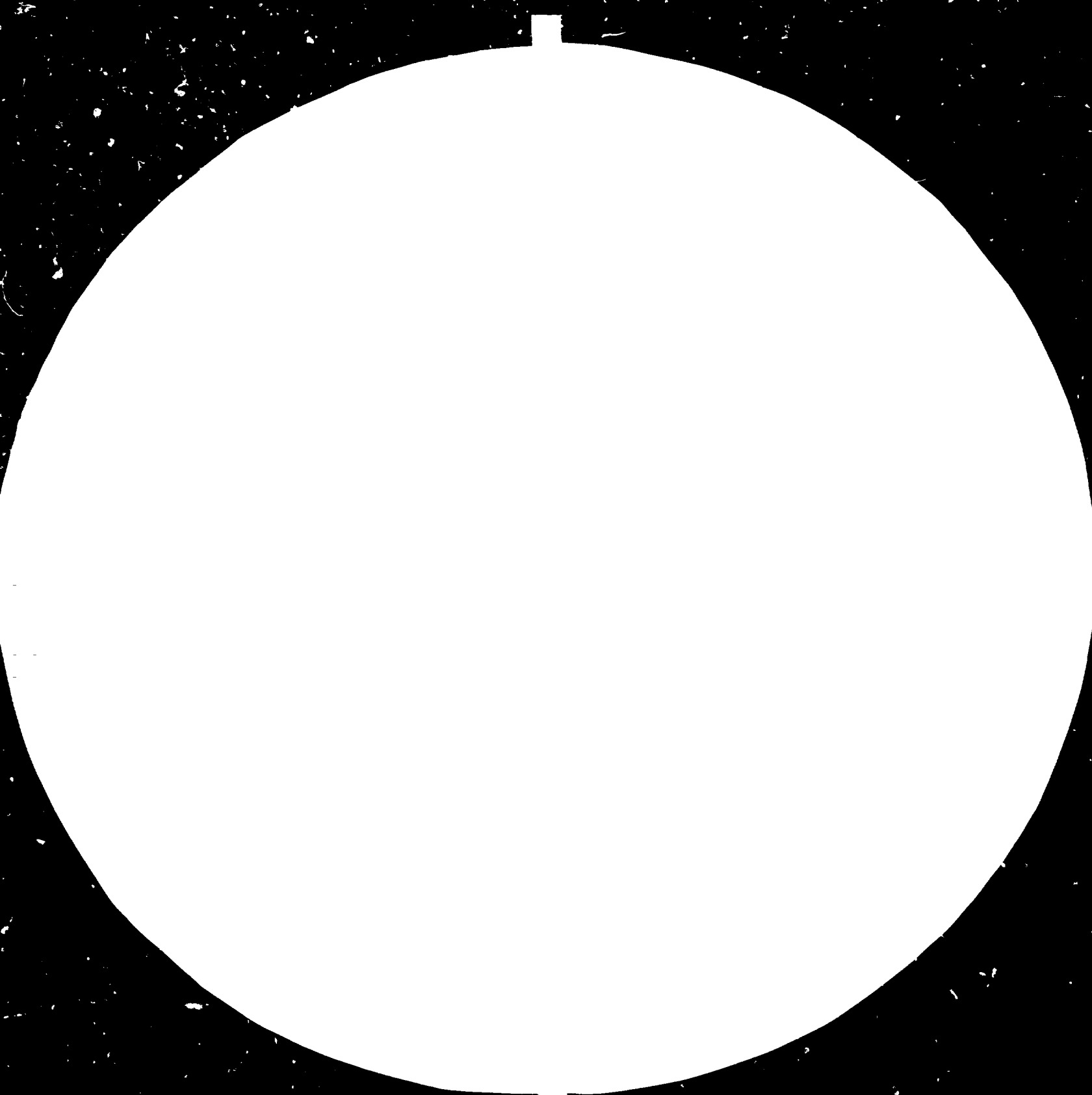

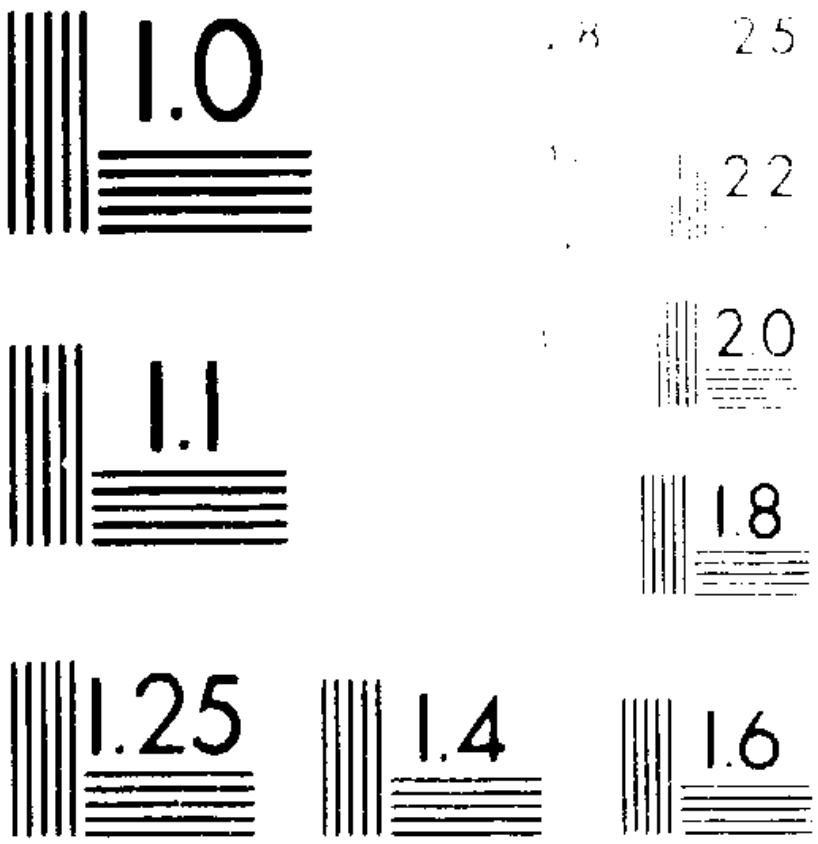
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December, 1984

Ethiopia.

ASSISTANCE TO HANDICRAFTS AND SMALL-SCALE INDUSTRIES DEVELOPMENT AGENCY.

E T H I O P I A

DP/ETH/83/012

Project Findings and Recommendations

Terminal Report prepared for

the Goverment of Ethiopia

by

Astrid Lerchenberger (Materials Processing Engineer)

for the United Nations Industrial Development Organization

acting as Executing Agency for

the United Nations Development Programme

EXPLANATORY NOTES

The monetary unit in Ethiopia is the Birr.

The value of the Birr in relation to the United States Dollar is

US $ 1 = Birr 2.07

Abbreviations used are:

HASIDA	:	Handicraft and Small-Scale Industries Development Agency
EHC	:	Ethiopian Handicraft Centre

Terminal Report for UNDP/UNIDO Project:
DP/ETH/83/012: Assistance to Handicraft and Small-Scale Industries Development Agency - Phase II
Addis Ababa, Ethiopia

ABSTRACT

This report which covers the period from August, 1982 tc December, 1984 is concerned with the activities at the HASIDA engineering department only. The writer is not involved in the overall functions of HASIDA.

The main activities of the engineering department during the period were:

- Preparation of artisan training programmes and supervision of training;
- Product and manufacturing design;
- Special tool, die and fixture design and manufacture;
- Prototype product manufacture;
- Equipment design and manufacture;
- Improvement of local technologies;
- General technical service to co-operatives and small-scale industries.

LIST OF CONTENTS

1 INTRODUCTION

1.1 Background

HASIDA (Handicraft and Small-Scale Industries Development Agency) was created in 1977 to implement the Goverment's policies and to encourage, assist and supervise the growth of this sector. In 1978, additional responsibility was by proclamation bestowed upon HASIDA to organize handicraft co-operatives.

The task assigned to the Agency are:

- to increase co-operation in the handicrafts and cottage industries to render them more productive both quantitatively and qualitatively;
- to up-grade existing craftsmen and industrial co-operatives through the provision of credits for buildings, machinery and equipment and the provision of technical and managerial assistance;
- to expand training facilities for artisans;
- to strengthen HASIDA organizationally and improve its staffing and facilities.

UNDP/UNIDO technical and financial assistance to the establishment and development of HASIDA commenced in 1978 through project No. ETH/77/018 with a stipulated UNDP input of US $ 1,519,235.

At the beginn ng of 1984 the project entered its second phase, project No. ETH/83/012 with a stipulated UNDP input of US $ 2,500,000.

1.2 Project Arrangements

The sequence of the project authorization should be detailed by the National Project Co-ordinator. The writer was temporarily attached to the engineering department only and not involved in the wider scope of HASIDA activities.

The engineering department is located at the EHC (Ethiopian Handicrafts Centre), formerly a handicraft school but now under the control of HASIDA.

A decision on whether the technical service centre, including the engineering department, should remain at this location is pending. A considerable expansion of building facilities at the present location is required to accommodate the equipment that will be used in the present project.

1.3 Project Objectives

The objectives of the part of the project with which the engineering department is concerned are:

1. to up-grade the technical, economical, managerial, supply and marketing services provided through the engineering and technical service centre to artisans, co-operatives and small-scale industries;
2. to design and draw up manufacturing specifications for all products to be produced by pilot industrial co-operatives;
3. to develop prototypes of improved tools and implements for use by artisans and co-operatives;
4. to train its engineers and technicians in the design and production of tools and implements as well as other relevant technical skills;
5. to train selected artisans and small-scale industry workers from different parts of the country in fundamental workshop skills.

2 ACTIVITIES

2.1 General

The writer started working as an Associate Expert under project No. ETH/77/018. When the project entered its second phase, project No. ETH/83/012, the post was changed to Expert in Tool- and Jig-Design.

This report summarises all the activities the writer has been involved in but concentrates on the final period of the project assignment. For details of activities in the earlier periods please consult:

1) Preliminary report of September 1982;
2) Progress report August 1982 to January 1983;
3) Progress report February 1983 to September 1983;
4) Progress report October 1983 to May 1984.

2.2 Training

Craftsmen were trained to work at the Maresha Industrial Co-operative, now under construction on the outskirts of Addis Ababa.

As an initial step, a group selected by the co-operative department of 48 traditional blacksmiths with a very low level of technical skill received a training in fundamental bench work. This training was completed in December, 1982.

Four of the above members were selected by the co-operative to act as instructors for the remaining 44 prospective blacksmiths. The training of instructors commenced in January, 1983. Apart from assisting in the training of the large group of blacksmiths, this team of four blacksmiths is engaged in trial manufacture of the products planned for the Maresha Industrial Co-operative.

Training of the large group in elementary blacksmith work and simple production commenced in July, 1983 but had to be stopped at the end of February, 1984 for lack of manpower.

For the basic training programme 16 learning units and for the blacksmith training more than 30 learning units in English were prepared and partly translated into Amharic. Each trainee's performance was marked on a scale of 1 to 5.

The training in elementary blacksmith work and simple production is only 20 o/o completed.

The major problem during the training period was obtaining raw materials on the local market.

The engineers in the department have received only on-site-training. Training fellowships in Ireland have been offered by UNIDO; the first of them is due to be taken up in April, 1985.

2.3 Product Development

The range of products for the start-up of production at the Maresha Industrial Co-operative was selected on the basis of market analysis by the HASIDA co-operative department.

This activity was concerned with establishing process steps from the raw material to the finished product. This included trial design and manufacture of special tools, jigs and fixtures and trial manufacture of the product itself. For each product, cost estimation, materials, equipment and manpower requirements were stipulated.

The "desk" engineering for all products (annex 1) to be used for start-up of production in the Maresha Co-operative was completed in May, 1984. Design and specification work for other products is in progress.

2.4 Tool and Product Trial Manufacture

Successful manufacturing trials have been completed in co-operation with the blacksmith team and workshop technicians for the following products:

1) Gesso, improved traditional soil digging tool;
2) Axe, improved traditional type;
3) Sledge hammer, 4 kgs;
4) Maresha, iproved traditional plough;
5) Wegel, improved traditional anchoring device for the Maresha;
6) Forked hoe;
7) Rake.

Estimates of costs, materials, equipment and manpower requirements were produced based on a request for the manufacture of 800 harrows from the Ministry of Agriculture.

Progress in the production of tools, jigs and fixtures and in manufacturing trials of products was (and still is) far behind expectations. The main obstacles are:

- A shortage of experienced technicians,
- Lack of raw material for tool production and manufacturing trials;
- Excessive time needed for tool manufacture;
- Poor quality of tools manufactured;
- No Metal Workshop Master since November 1982;
- High turnover of workshop staff;
- Changing of priorities;
- Shortage of technicians.

2.5 Equipment, Maresha Industrial Co-operative

Using the specifications previously prepared by the HASIDA co-operative department, tenders for imported equipment were analysed and summarized in a recommendation letter. Subsequently orders were placed by HASIDA for equipment totalling approximately Birr 500,000 (goverment funds). The first consignment arrived in Addis Ababa in May, 1984 and the last in October, 1984.

Receiving and unloading of the consignments were complicated by:

- Poor building construction and lack of a proper access road;
- Delivery of some items in crates too big for easy handling.

Installation and testing (except the 63t press) was completed in December, 1984.

Production is expected to start after the arrival of the expert in tool- and die-making.

Designs were made for approximately 20 different types of simple equipment (e.g. forges, benches, shelves) to be manufactured locally. This activity was completed in May, 1983.

Finding the necessary raw materials on the local market proved to be very difficult. Designs had to be revised to take account of materials that could be obtained.

There are still a few minor items left to be manufactured.

Other reasons for delay are mentioned under chapter 2.4.

2.6 Improvement of Local Technologies

2.6.1 Drop Hammer

Following a recommendation to HASIDA management to produce a drop hammer in Ethiopia for experimental blacksmith work, the design for a powered drop hammer was completed in July, 1983.

Drawings were passed to the metal workshop for manufacture. Work began on some parts, but manufacture was postponed in favour of other priorities.

2.6.2 Potter's Wheel

Since the potter's wheel (kicking type) currently available from the EHC is not very popular with

co-operatives it was decided to offer an alternative. The design is based on a treadle-type model with the possibility of motor connection.

The design was completed in September, 1984 and the drawings passed to the metal workshop for trial manufacture.

Manufacture has been put off in favour of other priorities.

2.6.3 Wool and Cotton Processing Equipment

A. Weaving Looms

The very well-designed EHC loom offered to the co-operatives by HASIDA is not very popular, perhaps because of its high cost in relation to output: the weavers' earnings are insufficient to justify the investment.

The objective was to develop a more efficient loom at lower cost, a rather difficult proposition. A number of modifications were designed and manufactured. Lack of co-operation from the weaving section and the setting of other priorities for the engineering department are reasons for not having completed this activity.

At the same time other looms used in EHC/HASIDA were studied (annex 2). The results led to the decision to design a semi-automatic loom similar to that used in Awassa (annex 3).

Detailed sketches of all parts and their assembly and a comprehensive parts list have been made. It was expected that a draughtsman would start in September, 1984 to turn all sketches into proper drawings, to enable trial manufacture of one prototype before the writer's departure. However, the draughtsman started working (part-time) only on 6 December 1984.

B. Heavy Carpet Loom

The heavy carpet loom now used in the EHC for the manufacture of knotted carpets is entirely made of

wood. In view of the difficulty and expense of obtaining wood in the country, especially in big pieces, the department was asked to give an alternative.

A design was made in which the wooden parts are entirely replaced by metal. The drawings were passed to the metal workshop and prototype manufacture was finished in August, 1984.

Comparing both designs the production costs are nearly the same, but taking account of the raw material situation priority should given to the metal design.

The loom is now being tested and modified.

C. Other

Two foot-operated weaving looms imported from India were assembled. Since no manual was delivered proper adjustment has been very difficult and results are not yet satisfactory.

Two simple carpet looms used for the manufacture of woven carpets were manufactured. They are now being tested and modified.

Manual reed manufacture was attempted with acceptable results but the process is extremely time-consuming. It was concluded that in view of demands for loom reeds in the country, machine reed framing would be more economical. Quotations for reed framing machines have been requested but not yet received. See annex 4.

The dyeing shop of the EHC plans to include bleaching of reels in its programme. The engineering department was requested to design a bleaching device. Drawings were passed to the wood workshop and manufacture started, but was postponed in favour of other priorities.

The engineering department was informed that the present method of softening woven blankets is to step on them, while they are kept in water. It produced a device to do the job mechanically, but in trials this proved unsuccessful. Doubts as to the accuracy of the information given to the engineering department inspired plans for a field trip to see the actual process, but the trip was postponed due to other priorities.

The local wool consists of very short fibers and no spinning wheel has as yet been found capable of coping with it. Therefore, wool spinning is still performed by hand. An attempt at making a suitable spinning device was made, but unsuccessfully. Further attempts were stopped due to other priorities.

2.7 External Service

The engineering department is required to give technical evaluations of requests for new installations, replacement of equipment and imports.

This has involved visits to and evaluations (summarized in a recommendation letter to the HASIDA industrial promotion department) of approximately 30 small-scale industries in various fields.

2.8 Workshop

The metal workshop in EHC is under the direct supervision of the engineering department.

The equipment in the shop is enough to cope with most of the incoming work. Some additional equipment is needed, in particular for tool- and die-making.

Progress in manufacturing all kinds of items fell short of expectations. The main obstacles have been listed in chapter 2.4.

Out of the designs made during the reporting period only 20 o/o were manufactured.

It is therefore, essential that the expert recruited for tool- and die-making report to Addis Ababa as soon as possible.

Estimates for the expansion of the technical centre (i.e. equipment for foundry, pattern making, electro-plating, materials testing, heat treament and electro shop) were requested. Some of those received have been analysed, and purchase recommended.

3 FINDINGS

Work progress in general has been below expectations.

There are too few mechanical engineering staff, and none of them has yet been on fellowship. There have been improvements in work capacity, but staff still lack the experience required to cope efficiently with the large variety of technical problems.

After the recent arrival of the two International Experts and the National Project Officer the floor area of the engineering department has been expanded to 110 sqms. Work efficiency is impaired by the lack of a direct telephone line.

A major obstacle to progress has been the extreme difficulty in obtaining raw materials on the local market; another has been time-consuming purchase procedures. Work often had to be interrupted for this reason. The raw material for tool- and die-making requested through UNIDO has not yet arrived in Addis Ababa.

Another obstacle to progress is the situation in the metal workshop: there are few technicians and turnover is high.

There is a shortage of supervisory personnel:

- No Engineering Department head;
- No Metal Workshop Master since November, 1982.

The Senior Technical Adviser left the project at the end of December, 1983 and was only replaced in late September, 1984.

It was not always realized that experimental work is time-consuming and needs an engineer, technicians and operator to be constantly available to co-operate in order to achieve optimum results.

Physical difficulties in communicating with the National Project Co-ordinator have led to a number of misunderstandings. It is hoped that the employment of a National Project Officer since September, 1984 will have a positive effect on this matter.

A major activity was preparatory work for the start-up of production of the Maresha Industrial Co-operative. A number of items Maresha is expected to produce are already being manufactured by a local tool factory, which is experiencing difficulties in marketing its products. It is likely that the Maresha Industrial Co-operative may face similar difficulties.

UNIDO would get much better value from the last few weeks of its experts' contracts if ways could be found of streamlining (or escaping!) the extremely burdensome procedures imposed by the Ethiopian Authorities on foreigners leaving the country for good.

4 RECOMMENDATIONS

a) To appoint an engineering department head;

b) To employ a competent metal workshop master;

c) To increase the engineering staff to at least 6 mechanical engineers and the metal workshop staff to at least 10 technicians;

d) To recruit additional supporting staff: 3 draughtsmen, 1 surveyor, 1 electrician;

e) To revise and increase the range of products selected for manufacture at the Maresha Industrial Co-operative;

f) To decide quickly where the expanded technical service centre should be located;

g) To revise the terms of employment and salary scales;

h) To give priority to imports of commonly used raw materials;

i) To speed up the arrival of the expert in tool- and die-making;

k) To speed up the delivery of the raw material requested for tool- and die-making;

l) To include intensive studies of raw materials (e.g. wool) and technologies used;

m) To establish and conduct skills up-grading training programmes for artisans in rural areas based on a survey of the present situation (raw material, know-how, workshop organization) and research into possible improvements in the tools, farm implements and other items produced.

The writer's last day of official duties at HASIDA/EHC is 20 December, 1984.

Addis Ababa,
December 1984

A P P E N D I X 1

to Terminal Report on Project:

E T H I O P I A

ETH/83/012

ASSISTANCE TO HANDICRAFTS AND

SMALL-SCALE INDUSTRIES DEVELOPMENT AGENCY

SUMMARY OF PRODUCTS FOR THE

MARESHA INDUSTRIAL CO-OPERATIVE

December, 1984

Summary of Products for the Maresha Industrial Co-operative

PP = Product and Manufacturing Design

PT = Product trial

Product No.	Product	PP incl. design	PT	Revis. design	Comments
02-001	Harrow	Nov. 82			PT not completed due to lack of raw material.
02-002	Rake	Nov. 82	Sep.84		PT with subst. material.
02-003	Gesso	Nov. 82	Satisf.	Dec.83	Sample available
02-004A	Axe, Europe type	Oct. 82			PT not completed 25t press not sufficient.
02-004B	Axe, improv. traditional	Dec. 83	Satisf.	Dec.83	Sample available
02-004C	Materbia	May 84	Satisf.		Sample available
02-005	Sledge Hammer	Oct. 82	Satisf.	Dec.83	Sample available
02-006	Blacksmith's hand hammer cross p., 1.4	Nov. 82			Quality of PT not satisf.
02-007	Blacksmith's hand hammer straight p. (1,4 kg)	Nov. 82			Quality of PT not satisf.
02-008	Maresha	Nov. 82	Satisf.	Dec.83	Sample not available due to lack of raw material
02-009	Wegel	Nov. 82	Satisf.	Dec.83	Sample available

Product No.	Product	PP incl. design	PT	Revis. design	Comments
02-010	Harrow pull bar for 2 elements	Nov. 82			PT not completed due to lack of raw material.
02-011A	Mekotekocha	Feb. 83	Satisf.	Jan.84	Sample available
02-011B	Mekotekocha	Sep. 84	Satisf.		Sample available
02.012	Forked hoe	Jan. 83	Satisf.	Jan.84	Sample available
02-013	Spokeshaven	Feb. 84			PT could not commence due to lack of manpower. Availability of raw material has not been proved.
02-014	Machinist hammer				Cancelled
02-015	Mason hammer	Feb. 84			PT could not commence due to lack of manpower. Availability of raw material has not been proved.
02-016	Hacksaw frame	Feb. 83			--- """ ---
02-017	Carpenters clamp	PP not completed. With the machinery of the workshop required square thread can not be achieved. Attempts to get information from abroad about existing tools are yet not satisfactory.			
02-018	Mason square				No sample
02-019	Chisel	Feb. 84			PT could not commence due to lack of manpower. Availability of raw material has not been proved.

Product No.	Product	PP incl. design	PT	Revis. design	Comments
02-020A	Blacksmith's tongs, close mouth	June 83			PT could not commence due to lack of manpower. Availibility of raw material has not been proved.
02-020B	Blacksmith's tongs, open mouth (6 mm)	June 83			--- " " ---
02-020C	Blacksmith's tongs, open mouth (12 mm)	June 83			--- " " ---
02-020D	Blacksmith's tongs, open mouth (24 mm)	June 83			--- " " ---
02-020E	Blacksmith's tongs, open mouth (48 mm)	June 83			--- " " ---
02-020F	Blacksmith's tongs, square mouth (60x30)	June 83			--- " " ---
02-020G	Blacksmith's tongs, square mouth (60x60)	June 83			--- " " ---
02-020H	Blacksmith's tongs, V-bit (Ø 6)	June 83			--- " " ---
02-020J	Blacksmith's tongs, V-bit (Ø 12)	Oct. 83			--- " " ---
02-020K	Blacksmith's tongs, V-bit (Ø 24)	Oct. 83			--- " " ---
02-021	Mini-scythe				Cancelled
02-022	Hinge				Metal Export

Product No.	Product	PP incl. design	PT	Revis. design	Comments
02-023	Fass	April 84			PT could not commence due to lack of manpower. Availability of raw material has not been proved.
02-024	Sheep shears	May 84			--- """ ---
02-025	Cement mill bolts		PT not completed. The 25 t press is not sufficient to set up the bold head.		
02-026	Mekoferia	March 84	Satisf. May 84		No sample
02-027	Brick hammer	April 84			PT could not commence due to lack of manpower. Availability of raw material has not been proved.
02-028	Chipping hammer	April 84			--- """ ---
02-029A	Door locker	May 84			--- """ ---
02-029B	Door locker	Oct. 84			--- """ ---

A P P E N D I X 2

to Terminal Report on Project:

E T H I O P I A

ETH/83/012

ASSISTANCE TO HANDICRAFTS AND

SMALL-SCALE INDUSTRIES DEVELOPMENT AGENCY

TRAVEL TO HASIDA WEAVING SECTION, AWASSA

October, 1982

TRAVEL TO HASIDA WEAVING SECTION, AWASSA

1. Purpose of Travel

To study different types of weaving looms used, Miss Asmeret Alazar and Astrid Lerchenberger went to Awassa. The study was made for the purpose of establishing appropriate steps for further improvement of the EHC loom.

2. Itinerary

Monday 4/10/1982, 1.30p.m. left Addis Ababa for Awassa. Accommodation in Wabe Shebelle (II) Hotel, Awassa. Return to Addis Ababa on Thursday 7/10/1982, 7.30p.m.

Permit arrangements delayed the start. At time for departure the person who was joining our group was not prepared.

On our arrival in Awassa the semi-automatic looms were not under operation because of the warp being finished. So that to set up one took 2 1/2 days and was not finished until Thursday noon.

3. Description of plant

In Awassa there are a total number of 15 looms:

1. 4 simple small looms (shuttle box, automatic resetting);
2. 4 simple big looms (shuttle box, automatic resetting);
3. 4 Indian programm able looms (Jacquard)
4. 3 semi-automatic looms

During our visit 6 weavers were working. Beside weaving their tasks were to wind thread on the shuttle spool (10 min. per spool) and preparation of the warp (setting up) (1 1/2 - 2 days).

4. Comments on operations

A table giving brief data for the four types of looms 1. - 4. is given on page 3. Sketches of all important mechanisms have been made.

.../2

At the types of loom 1. - 3. the automatic forward motion was out of action because of worn gears. A request for repairs was made to Ato Brihanu Ejigu and Tasew Kassahun through Ato Tiruneh G/Medhin one year ago. This request has not been passed to the Engineering Department. It was suggested to Ato Tiruneh G/Medhin that he should send his request either to the EHC Engineering Department or to Ato Selameab G/Tsadik directly. Resetting by hand is a time-consuming job. The gears should be replaced as soon as possible.

5. Recommendation

The only advantage of the programmable looms (No. 3) is to produce more complicated patterns. This has no influence on the speed (motion of woven materials). This loom is therefore, not considered as a suitable model for manufacture and distribution in bulk at present. The two programmable loom in the EHC could be sent back to Awassa.

The semi-automatic loom (No. 4) is the fastest of all looms so far studied. Reed and shuttle motions includes shifting and forward motion of material. The inter-connection of different motions is solved by imploying several gears and linkages. To avoid high production costs simple mechanisms should be developed.

However, for further improvements and trial it would be helpful if one of the present EHC looms was allocated for use by the Engineering Department only. It is planned to change parts one by one in order to prove the advantage of each single step.

.../3

Weaving looms Awassa TYPE	Introduction	TIME STUDY threads per minute	replacement of thread in shuttle (sec)	resetting of work piece	Remarks
1. Small loom, No.1 (1.24m length of roll at weaving location)		37 - 43	20	all 2min. 20sec.	because of worn gears the automatic forward motion was not in use at all
2. Big loom, No.6 (1,64m length of roll at weaving location)		73 when pattern 43 - 59	15	gears are worn out forward m. slower than weaving operation: all 90sec. add. resetting	very fast operator
3. Indian programmable loom, No.2 (Jacquard)	operator worked with 2 shuttle on a complicated pattern	11	30	10min.	the advantage of the programmable loom is to produce more complicated patterns only. Not a model for use in improving output for at existing EHC loom
4. Semi-automatic loom, No.4		110	--	automatic	a lot of gears and linkage. To avoid too high production costs further study is necessary.

A P P E N D I X 3

to Terminal Report on Project:

E T H I O P I A

ETH/83/012

ASSISTANCE TO HANDICRAFTS AND

SMALL-SCALE INDUSTRIES DEVELOPMENT AGENCY

SEMI-AUTOMATIC LOOM

October, 1984

INTRODUCTION

High demand for woven material and dependence on imports prompted a decision to increase the output of material woven in Ethiopia. As a first step the looms used in the EHC/HASIDA were studied. The results led to the decision to copy and improve the semi-automatic loom (Indian loom) used in Awassa (Annex 1).

DESCRIPTION OF ACTIVITY

Detailed sketches of all parts and their assembly and a comprehensive parts list have been made of the semi-automatic loom successfully used in the EHC/HASIDA. These detailed records can serve for the future manufacture of spare parts.

A meeting held on 15 October, 1984 was attended by:

Ato Tesfaye Bekele, Loom Expert
Ato Demrew Metaferia, Engineering Department
Mr. Eddie Malagkit, Engineering Department
Ms. Astrid Lerchenberger, Engineering Department.

The participants agreed that:

a) The frame should remain in wood;
b) The loom should remain hand-operated with the option of motor drive;
c) The tempel rod, consisting of a number of casting parts, would be replaced by a very simple mewetteria;
d) The helical gears would be changed to spur gears. All gears would be designed as welded pieces.
e) The flywheel, at present made out of cast iron, would be changed to a welded piece;
f) The sliding bearings, at present made out of cast iron, would be changed to either bronze bushings or ball bearings;
g) The tension weight would be changed to a friction disc;
h) The flying shuttle would be changed to an under pick.

Research will continue as this initial programme is put into effect.

.../

RECOMMENDATION

1. A draughtsman should turn all sketches into proper drawings.

2. Formal designs should be made of the semi-automatic loom based on the discussions on 15 October, 1984.

3. Prototype manufacture should include the specifications, indentification and purchase of raw materials and standard parts on the local market.

Full-scale production would being as soon as the design had been fully tested and the necessary manufacturing facilities and supplies were available.

ANNEX 1

CHARACTERISTICS OF THE LOOM

	EHC-Loom	Indian Loom	Improved Loom
1. Let-off motion	Hand-operated ratchet	Tension weight	Friction disc
2. Forward motion	Hand-operated ratchet	Geared from reed motion	Geared from reed motion
3. Shaft (heald) Motion	By foot	Geared from reed motion	Geared from reed motion
4. Tempel rod	Mewetteria	Tempel rod	Mewetteria
5. Shuttle motion	By hand	Hand-operated flying shuttle	Under-pick
6. Output threads per min.	18	110	?

It will be seen that:

a. All main operations on the EHC loom are done with a combination of hands and feet.

b. On the Indian loom all operations are done by the hands.

c. The improved loom will involve only one of the operator's hands.

A P P E N D I X 4

to Terminal Report on Project:

E T H I O P I A

ETH/83/012

ASSISTANCE TO HANDICRAFTS AND

SMALL-SCALE INDUSTRIES DEVELOPMENT AGENCY

TRAVEL TO DIRE DAWA TEXTILE MILL

M E M O

To: Ato selameab W/Tsadik
General manager, HASIDA

From: Engineering Department
Asmeret Alazar,
Astrid Lerchenberger

Date: 22 December, 1983

Subject: Travel to Dire Dawa Textile Mill

1. Purpose of Travel

Feasibility of importing reed framing machine for use within HASIDA, to make such machine in total or in part locally or possibly having all reeds manufactured in Dire Dawa should be studied.
The study was made by Asmeret Alazar and Astrid Lerchenberger from Engineering Department and Tesfaye Bekele from the Weaving Department.

2. Itinerary

Tuesday 13 December 1983, 7.00 a.m. left Addis Ababa for Dire Dawa by train.
Accommodiation in Ras Hotel and Karmara Hotel, Dire Dawa.
The Dire Dawa Textile Mill was visited on 14 and 15 December.
Return to Addis Ababa on Friday 16 December 8.30 p.m.

3. Visit to Dire Dawa Textile Mill

We were introduced to the General Manager Ato Redi.
All conversations concerning the reed were held with the weaving department head, Ato Alemayehu.
The factory operates with app. 1080 automatic weaving looms. These looms, as well as 80% of all machinery, including the reed framing machine, are imported from Japan.
The reed framing machine was purchased in 1963 (GC) for Birr 8920.00 and has the following specification:

Manufacture	Kame Ltd.
Year of manufacture	1963
Outside width of reed	3½" - 6½"
Length of reed	100"
Dents	15 to 175 dents per 2 inches

.../

Upto now the reed framing machine has been running without any need for spare parts. The production is 3 to 5 reeds per day, involving three man-hours, and covers the demand of the Textile Mill.
The raw material used to manufacture the reed is imported. Delivery time, including formalities within Ethiopia, is 6 to 9 months. The raw materials is imported from different suppliers selected on the basis of the cheapest offer. Out of the suppliers three are as follows:

1) Marubeni Co-operation
   C.P.O. Box 595, Tokyo 100-91, Japan;

2) Toyo Kikai Boeki Kabushiki Kaishs
   Towa Building (Room No. 702), 26
   Shiomachi-Dori 4-Chome
   Minami-Kex, Osaka-542, Japan;

3) Sun Fuji Co., Ltd.
   P.O.Box 151, Semba Post Office
   Osaka, Japan.

HASIDA represented by Ato Tesfaye attempted to arrange further purchase of reeds from the Textile Mill. The cost would be Birr 18.00 per reed. Ato Tesfaye reports separately on this subject.
The weaving department head Ato Alemayehu was asked, if the Textile Mill could provide section material (app. 1,5 kg. width 2.8 mm and thickeness 0.5 mm) for one reed to try a different way of manufacturing the reed. He replied that a written request is necessary. The head of HASIDA branch Dire Dawa Ato Legesse T/Georegis will follow up this matter.

4. Recommendation

It is not advisable to manufacture the reed framing machine locally. The metal workshop is not capable of manufacturing all the necessary gears, the long bed and the tightening system.
Before importing the reed framing machine further study on the demand for reeds should be made.
Purchasing the reed framing machine is only to be recommended, if the yearly demand exceeds 2000 reeds in which case the import of the machine is considered more economical than purchasing the reeds from Dire Dawa.

c.c. - EHC, Administration;

- Ato Tesfaye Bekele
  Weaving Department, Addis Ababa;

- Ato Legesse T/Georegis
  Regional Office, Dire Dawa