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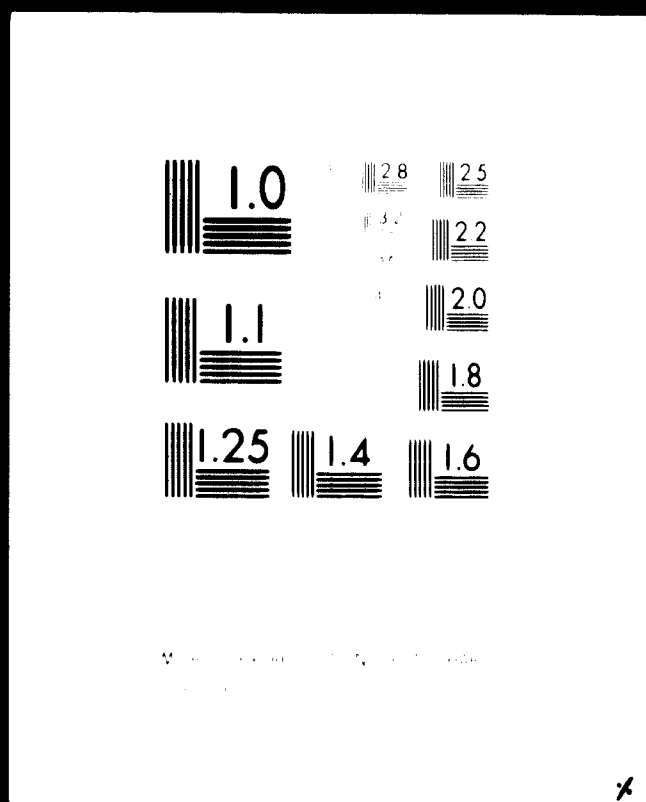
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**UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION**

**PROJECT**

**REPAIR AND MAINTENANCE OF INDUSTRIAL EQUIPMENT  
IN THE DEVELOPING COUNTRIES**

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**FIELD-SURVEY REPORT IN SOMALIA**

608553

**ITALCONSULT**

**Rome, March 1969**

TEPCO TELECOPY

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

*Submitted by 68/1 and  
68/2*

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## SUMMARY

A preliminary survey was carried out in Somalia, on behalf of UNIDO, by a 2-expert Italconsult team, in order to assess the present efficiency of the maintenance and repair services for existing industrial equipment and the need for future improvement

The survey was limited to the Benadir District, which accounts for more than 90% of the country's industrial capacity. In addition a quick survey was carried out in the Juba District, on account of its importance as a banana-growing area

The survey has shown that, with some exceptions and irrespective of the cost, the few existing industrial establishments of a certain importance resolve their maintenance problems by means of in-plant facilities and by carrying a heavy spare parts inventory. However, very acute problems are to be found in the other industries, all of which are of very small dimensions, and none of which have in-plant repair facilities

The external workshops are generally undersized and, with some few exceptions, poorly equipped and operated. The man-power is in general of a very poor standard. The problem is aggravated by a severe shortage of spare parts, for which there are no import restrictions, but which are affected by many other adverse factors (heavy customs duty, large purchase lead times, poor standardization)

Furthermore, some districts completely lack any effective maintenance services

An implementation program has been suggested, providing for short term assistance by a 4-man team on a 12-month assignment, and long term assistance the details of which will be worked out on the basis of the advice and findings of the first team

Counterparts should work with the UNIDO team so as to obtain a full understanding of the methods of tackling the problems, and to provide the nucleus of an efficient staff for a future Management Consulting Center at the Ministry of Industry.

It is felt that such a program of assistance would be of great help for the Country's industrial development.

## 1. INTRODUCTION

A long-term campaign has been planned by UNIDO to improve the maintenance and repair services for existing industrial equipment in the developing countries

As an initial approach to the problem, it was decided to carry out a sample survey of some representative countries.

The objectives of the envisaged field studies were mainly:

- to enable UNIDO to choose the countries in which to start implementation of the campaign;
- to identify the crucial fields in the surveyed countries, in which assistance is urgently needed;
- to help UNIDO to formulate a long-term working program in the field of repair and maintenance both for the chosen countries and for the developing countries in general

Field surveys for a group of countries comprising Kenya, the United Arab Republic and Somalia were assigned to Italconsult, Rome, under Contracts No. 68/1 and 68/6

The present report refers to the field survey carried out in Somalia from January 4 to January 19, 1969 by a Mission composed of two Italconsult experts. However, the Chief of Mission could not arrive in Somalia until January 10, it being necessary for him to remain in Nairobi longer than planned to collaborate with Mr. Fawzi of UNIDO in the conclusive phase of the Mission to Kenya.

The field survey in Somalia essentially followed the lines of the general plan of operations outlined by UNIDO (see Annex A of Purchase Order). However, it was not possible to go thoroughly into the macro-economic data as suggested in point 3.1 of Annex A, partly because of the shortage of available statistical data and partly because the Chief of Statistical Department, Ministry of Planning and Coordination could not give the breakdown of some official data.

The Country's industrial structure and its regional, sectoral and dimensional breakdown, on the basis of the data received, is set forth in Table 1. It is apparent from this table that the greatest concentration of industry is in the Benadir region which contains 78% of the industrial establishments and 96% of the related employment. All the most important industries are also located here, apart from the new Kisimaio Meat Factory.

In view of this fact and because of the extreme shortage of time and the difficulty of communications, the local UNDP Representative authorized the Mission to limit the field survey to the Mogadiscio area, paying a brief visit only to the Juba District - mainly because of its importance as a banana growing area - and omitting visits to other districts.

In preparing the report, as far as the available data have permitted, it has been attempted to adhere to the sectoral criteria used in the ISIC Code, rev. 1, enclosed in the following page.

**ISIC CODE**

**INTERNATIONAL STANDARD INDUSTRIAL CLASSIFICATION, REV. 1  
(for Economic Activities concerning Somalia)**

<b>Group 011</b>	<b>Agriculture and Livestock Production</b>
<b>Group 201</b>	<b>Slaughtering, Preparation and Preserving of Meat</b>
<b>Group 202</b>	<b>Manufacture of Dairy Products</b>
<b>Group 207</b>	<b>Sugar Factories and Refineries</b>
<b>Group 214</b>	<b>Soft Drinks and Carbonated Waters</b>
<b>Group 231</b>	<b>Spinning, Weaving and Finishing of Textiles</b>
<b>Group 241</b>	<b>All Kinds of Footwear from Any Raw Material</b>
<b>Group 260</b>	<b>Manufacture of Furniture and Fixtures</b>
<b>Group 291</b>	<b>Tanneries and Leather Finishing Plants</b>
<b>Group 312</b>	<b>Vegetable and Animal Oils</b>
<b>Group 319</b>	<b>Miscellaneous Chemical Products</b>
<b>Group 341</b>	<b>Iron and Steel Basic Industries</b>
<b>Group 360</b>	<b>Manufacture (and Repairs) of Machinery Except Electrical</b>
<b>Group 511</b>	<b>Electric Light and Power</b>



The official figures are for 1967. They are incomplete inasmuch as certain important industries have been set up since then which substantially modify the data for some sectors of activity. Specific mention will be made of these changes at the appropriate point in the report.

According to the official statistics, there are apparently 121 industries in Somalia with more than 5 employees. However, only 39 of these employ a staff of over 10 and may thus be considered to be of some economic and industrial importance. The Mission decided to visit 23 of these, chosen to be representative of the various sectors of activity. The reports on these visits are given in the Appendices, where every effort has been made to highlight the aspects and data of major interest for this survey. It should, however, be noted that this task was often rendered difficult by the reticence of the executives interviewed, or more simply by their apparent lack of appreciation of certain accounting and statistical aspects of management. It is finally to be noted that the report has been structured according to the basic principles stated in the contract's Annex B; and that the 2nd and 3rd digits of the report's Chapter 2 correspond to the itemization of para. III, 1 to 4 of the contract's Annex A.

## 2. REPORT ON THE SURVEY

### 2.1 IMPORTANT INDUSTRIES

a) The general structure of Somali industry, according to the 1967 statistics is shown in Tables 1a) and 1b), while its sectoral make-up is given in Table 1c). However, the following points must also be made

- Since these tables refer only to industrial establishments, they do not contain any data on banana growing, which was however surveyed by the Mission in view of its social and economic importance (some 25,000 employees), and of its foreign exchange earning capacity (So Sh 90 million, equivalent to 40% of total exports)
- Groups 20-21 do not include data on the new Kismaio Meat Canning Factory since it is not yet in operation; it is expected to give employment to 450 people
- Group 231 does not appear in the tables, but this is now represented by the new SOMALTEX Textile Factory, which is expected to employ 500 when operating at full capacity
- SOPLAST has been included in Group 26, because although it processes thermoplastic resin its main activity is the production of furniture. However, this enterprise is not included in any group of the official 1967 statistics
- Group 312 (vegetable and animal oils) does not appear in the table in question because the statistics have not taken into consideration the VECCO Oil Mill which still retains some degree of importance despite the general decline of this activity

However, the new cotton production scheme planned to supply raw materials for SOMALTEX should revitalize this sector and lead to the re-opening of the most important ginneries and oil mills which have been closed for some time owing to a shortage of raw materials

- Group 360 is ignored in the official statistics although in actual fact it includes a fair number of workshops, especially concerned with vehicle and tractor repairs, and most certainly giving employment to several hundred people. There is no doubt that these workshops are of basic importance in view of the expected increase in motorization
- b) The age of the firms in the various groups of activities is certainly fairly advanced with the exception of some which were created recently in the preserving industry (meat), dairying, soft drinks and a few others of minor importance
- c) Table 2 shows the importance and the impact on the national economy of these various groups of activities (with the limitations already dealt with in paragraph a)

Table 1

**COUNTRY'S INDUSTRIAL STRUCTURE  
REGIONAL, SECTORAL AND DIMENSIONAL BREAKDOWN**

*a)* Regional Distribution of Industrial Establishments (employing 5 or more persons)

Region	No of Establishments	No of Persons Engaged
Benadir (Mogadiscio)	94	6,375
North Western	19	211
North Eastern	8	72
Upper and Lower Juba	-	-
<b>Total</b>	<b>121</b>	<b>6,658</b>

*b)* Distribution of Industrial Establishments According to Number of Persons Engaged

No. of Persons	No. of Establishments	%	No. of Persons Engaged	%
5 to 9	82	67	517	8
10 to 49	34	28	714	11
50 to 99	1	5	73	81
100 and over	4		5,354	
<b>Total</b>	<b>121</b>	<b>100</b>	<b>6,658</b>	<b>100</b>

*c)* Distribution of Industrial Establishments According to Activities and Personnel Engaged

No. of Persons	Major Group of Activity (ISIC Code)							Total
	20+21	24+291	26	28	33	39	51	
5 9	9	25	22	2	12	11	1	82
10 49	11	2	7	2	7	2	3	34
50 99	-	-	-	-	-	-	1	1
100 and over	1	1	-	-	-	1	1	4
<b>Total</b>	<b>21</b>	<b>28</b>	<b>29</b>	<b>4</b>	<b>19</b>	<b>14</b>	<b>5</b>	<b>121</b>

Source: "Compendio Statistico Somalia" - Ministry of Planning and Coordination, Statistics Department - Mogadiscio, June 1968.

Table 2

**STATISTICAL DATA FOR ECONOMIC ACTIVITIES GROUPED  
ACCORDING TO ISIC CODE, REV. 1**

ISIC Code of Activity	Description of Activities	Values in 1,000 So.Sh					
		No of Establishments	No of Persons Engaged	Repairs and Maintenance Done Outside	Input	Value Added	Gross Output
200	Food manufacturing except beverages	17	5,167	19	9,040	32,801	41,841
214	Manufacturing of beverages and mineral water	4	122	21	501	926	1,427
243	Manufacturing of wearing apparel except footwear	20	117	-	699	382	1,081
260	Manufacturing of furniture and fixtures	29	234	5	1,019	1,193	2,212
280	Printing, publishing	4	78	1	771	908	1,679
331	Manufacturing of leather and footwear	8	185	1	782	569	1,351
339	Lime factories	13	93	-	124	55	179
391	Manufacturing of structure clay products	6	116	15	1,226	1,137	2,363
394	Manufacturing of jewellery and related articles	8	57	-	474	201	675
399	Manufacturing of industries not included	6	175	205	3,630	6,095	9,725
511	Electricity, light and power	6	314	-	10,203	10,102	20,305
	Total	121	6,658	267	28,469	54,369	82,838

Source: "Compendio Statistico Somalia" - Ministry of Planning and Coordination, Statistics Department - Mogadiscio, June 1968

above). By far the most important is Group 200 (food manufacturing) which accounts for 80% approx. of the labor force in the manufacturing sector and provides 60% of the value added and 50% of the gross output.

- d) Apart from bananas, as mentioned above, the importance of the various groups of activity in the field of exports seems very limited.

The 1965 Somali Customs Statistics show that the export of manufactured products was mainly limited to 15 million So.Sh. of hides and skins, accounting for 6% total exports, while meat and fish products, at 4 million So.Sh., account for 2% of the total. However, these figures may well be altered to some extent by the new installations spoken of earlier in the meat-processing sector.

From the development aspect, however, certain groups of activities could perhaps play a bigger role as import reducing industries. Sugar is a typical example: indeed, imports amounted to 15 million So.Sh. (12%) in 1965 but were practically negligible in 1968. For a few years, however, it has been exporting 40,000 hl alcohol from molasses, which constitutes a good contribution to the country's total exports.

- e) Finally, as regards the type, age and condition of equipment in the various groups, the situation may be summed up as follows:

- Group 011: in the banana-growing sector the age and condition of the machines may be considered average, but there is little standardization
- Group 202: the Mogadiscio Dairy Factory is of relatively recent construction but it is not in such a good state of conservation as one might expect
- Group 207: the SNAI Sugar Factory has been almost entirely renovated in recent years and appears to be in a very good condition.
- Group 214 (soft drinks): the plants covered by this grouping are of recent construction and in good condition
- Group 231: SOMALTEX, which is the only important firm in this branch, is still in the completion phase.
- Groups 241 and 291 (footwear and leather): plants in very mediocre condition. The same holds good for Group 260 (furniture) even though SOPLAST is a new concern.
- Group 312 (vegetable oils): most of the plants have been closed for years and the only largish one still operating is the VECCO Oil Mill which is of advanced age but in fair condition, plus a few dozen small presses of Japanese make. Should the sector become active again, there are a certain number of ginneries which have been closed for years and a few oil mills of some size (De Vincenzi Oil Mill) which are not particularly old: these could be reactivated

- Group 319 (miscellaneous chemical products) there are some new firms of minor importance in the detergents and pharmaceutical fields; a small, recently built paint works; and some old soap works whose fortunes have more or less followed trends in the oil industry
- Group 341 (iron and steel industries) this group includes FERSOMAI A's old plant (even though opened recently) which seems to be in a rather precarious state of efficiency. In addition, there is an old, inadequate foundry
- Group 360: this embraces a range of mechanical workshops a few of which are modern and efficient, some in an average condition, and a relatively large number of very small shops whose degree of efficiency is very low. Particular mention should be made here of the ONAT and the Somali Port Authority Workshops because of the important roles they are called upon to fulfil, and because of the benefits which would accrue to the general economy of the Country if their efficiency were improved
- Group 511 (electric light and power) there are a number of power stations of various sizes and types, all thermal. The SEIS company in Mogadiscio is far and away in the best state to carry out its task effectively and has added a considerable amount of capacity over the last few years

## 2.2 EXISTING REPAIR AND MAINTENANCE PHYSICAL FACILITIES

- a) Only a few major processing plants and some of the service companies (SEIS, ONAT, CIEFFE, Somali Ports Authority) have their own maintenance and repair section. In general, they are well equipped so as to be independent, and sometimes use their excess capacity to meet occasional demand from outside concerns. However, some of them seem to be in a rather inefficient condition. There are generally properly conceived and correctly executed maintenance schedules in operation, especially in the processing industries. In the smaller industries (and these are in the great majority) there are neither workshops nor maintenance schedules. Only when serious breakdowns occur are emergency repairs made using the services of local outside workshops.

On the basis of their efficiency the repair shops can be classified as follows:

- a limited number (two or three) are very well fitted out and run, but some of them voluntarily restrict their level of activity because of difficulties in training staff and so as not to lower their quality standards.
- a certain number of averagely-well equipped and managed shops which often operate with an overload of work.
- an increasing number of very small, poorly equipped, badly run workshops which live a hand-to-mouth type existence and whose clientele consists almost

exclusively of taxi drivers and private car owners whose numbers are steadily growing

- b) The only firms which may be considered as centralized workshops, in consideration of the capacity and diversification of their equipment, are

the Government owned ONAT and Somali Ports Authority Workshops, (see Appendices 19, 20) and

the privately owned FIAT-Somalia and CIEFF (see Appendices 16, 18)

- c) The limitations of the market (high import duties and excessively long reorder leading times (closure of Suez Canal and red-tape) render the spares problem particularly acute, despite the fact that in principle there are no import restrictions. The position is further worsened by the relative lack of standardization. Companies which wish to ensure the required margin of safety where spares are concerned have to tie up anything up to 20-25% of the value of the machinery in parts.
- d) Apart from ordinary mechanical components, there appear to be no spare parts manufacturing facilities available. However, most of the problems could be resolved by setting up a small but efficient iron and non-ferrous alloys foundry.
- e) Fairly organized adequate spare parts stores are only to be found in Mogadiscio and Scasimbot and then only for motor vehicle and tractor spares. In other centers of consumption and in other sectors, the situation is highly critical and often much ingenuity is required to resolve the problems which arise from day to day.

## 2.3 PREVALENT CONDITIONS OF REPAIR AND MAINTENANCE ACTIVITY AND DIAGNOSIS

- a) It is not easy to express in figures the negative effects of the lack of efficiency of the repair and maintenance services mainly due to the fact that there is a marked lack of understanding of the accounting and statistical aspects of management.

Nevertheless it is possible to state that at the ONAT Sugar Mill production lost through maintenance difficulties is estimated to amount to \$ which is equivalent to Sh 500 000 per annum. But it should be borne in mind that this is one of the few really well run concerns in Somalia and that this result is obtained by tying up 25 MP of the capital cost of the machinery in spares.

The high percentage of idle time in the ONAT's fleet (see Appendix 19) and even more so the very low efficiency of the Somali Ports Authority (see Appendix 20) with its impact on the ports operating costs and on the national economy are typical examples of the effects of the inadequacy of maintenance and repair services.

- b) Since the most important processing industries are the only ones with the most

efficient, independent maintenance and repair services, the field where the problem is most felt is vehicles and tractors, affecting the two most important activities of agriculture and transport.

- c) The identification and the grading of factors affecting the efficiency of maintenance and repair can be expressed as follow.
- i) Training of management personnel in technical and organizational skills;
  - ii) Training of labor;
  - iii) Lack of maintenance of the physical facilities for maintenance and repairs;
  - iv) Lack of a good foundry;
  - v) Lack of a good commercial organization for special steels and raw materials in general;
  - vi) Lack of certain special-purpose equipment: gear cutters and grinders, heat treatment equipment, special welding equipment, foundry, etc
- d) The effect, on maintenance and repair, of the absence of standardization, and unnecessary variety of equipment is no doubt very marked. The study of the problem for a small country such as Somalia would however appear to be quite difficult, though some recent examples may turn out to be quite indicative (1). An approach to the problem could be attempted by UNIDO through a Special Commission for the Standardization of Industrial Supplies to the Developing Countries.
- e) There is at present no Government or private institution specially dealing with repair and maintenance.
- f) No Government policies have been as yet studied affecting repair and maintenance except a general training program for trades, including those concerned with the needs of general workshops.

## 2.4 PERSONNEL

- a) Sufficient highly skilled personnel such as is needed for maintenance and repair purposes is scarce even in the most developed countries. It is therefore quite natural that such personnel is even more difficult to obtain in Somalia.

It has not been possible to obtain quantitative information on maintenance workers and thus it is not possible to compile figures of personnel who have had or are

(1) For example, different makes of tractors have been considered in two recent UNIDO projects: the A. Somaliland Project and the Mogadishu, Somalia Project.



undergoing training in repair and maintenance

As far as concerns general technical education, the total output of students from Technical Institutes in Somalia would not appear to exceed a few hundred, at most

- b) There are three secondary schools in the Country (at Hargeisa, Burao and Mogadiscio) for training technical personnel at the middle level, and a school in Mogadiscio for training draftsmen and accountants.

In the vocational training field, Mogadiscio has one industrial school which can accommodate around 200 students coming from elementary schools. The school has a fair amount of machine tools, a good number of classrooms and 20,000 sq m of land adjacent which could be used for extensions.

There is no organic and rational scheme nor specific accommodations and facilities for providing workers with complete theoretical and practical training in specific work sectors, nor are there any programs for in-plant training. It would also appear that there are no programs for courses for up-grading workers presently employed

To overcome this deficiency, the Somali Government submitted a request to the Mogadiscio Agency of the UNDP in July 1968 for the creation of a Pilot Center for training both workmen and instructors in various trades. The project should last 4 years and cover the following three aspects of vocational training:

- training instructors for possible future centers;
- rapid training courses for 18-35 year-old people with an elementary school leaving certificate;
- up-grading of workers, which would be a 3-year full time course

It is felt that the Somali Government's request should be given every consideration and implemented as a matter of urgency, since the most marked limiting factor for the country's industrial development appears to be the absolute lack of skilled manpower which will slow down the implementation of future initiative

### 3. CONCLUSIONS AND RECOMMENDATIONS ON FUTURE POLICY

- a)* From what has been written above, it is apparent that substantial improvements are required in maintenance and repair services, except in the case of a few, large, old established and soundly-operated industrial complexes. Priorities would appear to be as follows (in order):
- Mogadiscio workshop of the Somali Port Authority, in view of the importance of sea-traffic to the country, the present operational difficulties at the main ports, and the present complete insufficiency of the workshop
  - Vehicle and tractor workshops, with special reference to the S.A.G. problem and to ONAT's needs for better fleet maintenance
  - Private repair shops which serve the minor industries and private motorists
- b)* Existing workshop physical facilities, though of the old type, can make a valid contribution to satisfying market demand if properly repaired. Non repetitive work, so typical of maintenance and repair jobs in general can, in fact, be done by conventional machinery, provided it is correctly maintained and operated.
- c)* At least three central regional workshops could be very useful at Mogadiscio, Kisimaio and Burao. Naturally the capacity and make-up of each of these would have to be worked out to suit the main requirements of the operational environment in which each would be located. It is also felt that careful study should be given to the utility of a mobile workshop in the Burao region, which seems to be the one with the worst infrastructural conditions. In view of the particular structure of Somalian industry - with the exception of the larger industries - it would not appear advisable to set up in-plant workshops other than those needed for a light maintenance. The maintenance jobs to be done in the case of most industries should, it is felt, continue to be farmed out to outside workshops whose operational capacity should, however, be improved.
- The study and implementation of good maintenance schedules, on the other hand, does appear to be absolutely necessary. To this end, external assistance in perfecting present procedures could be of great benefit even for the largest industries.
- d)* Again because of the Country's particular industrial and social structure, it would seem very advisable to make a special study of problems bearing on the choice and priorities to be given to training. It is considered that short-term solutions should first and foremost be aimed at a rapid upgrading of the workers and managers of the small workshops which constitute the basis of this important industrial service. The long-term program, on the other hand, should be the outcome of a thorough study of projects which various National and supra-national agencies have under way.
- e)* While excluding the few major firms, which for the reasons indicated above must have their own, largely independent store and excluding a few spares for important special purpose

machines in minor enterprises, it would seem advisable to run a very careful study on the geographical distribution and on the quantity of spares carried by external stores, and on the best systems of interrelation, bearing in mind industrial concentrations and the transport and communications infrastructures.

- f) In any case, the introduction and popularization of modern inventory control procedures would seem both necessary and useful, even in the larger enterprises
- g) Finally, it is felt that a careful study might be made of the need for spares on a national scale and for the creation of a workshop to produce as much of the Country's spares requirements as possible. The production facilities of such a workshop should, of course, be coordinated with the capacities of the existing shops
- h) The role that can be played by developed countries and mother-factories in the implementation of this program may be summed up in the following points:
  - i) Improvement, as far as possible, in the network, inventory and interrelationships of the mother-factory's stores, not only on a national basis but on an international scale too (e.g. the installation of central stores in duty free compounds strategically located to best serve given groups of countries)
  - ii) Financial participation of the mother companies in the setting up of central repair workshops (sub-agencies) or the supply of machinery and personnel on a fellowship basis
  - iii) Technical assistance for the improvement of the maintenance organizations in individual enterprises, and for the creation and operation of training centers
  - iv) Technical assistance, supply of drawings and machinery, and financial participation in the creation of spare parts manufacturing or reclamation facilities
  - v) Supply of personnel for maintenance training in the different factories

A comprehensive study should be submitted to Governments and mother-factories, specially concerning its commercial, technical and financial features, and a proposed scheme for the expected financial and technical assistance

#### 4. SUGGESTED PROGRAM OF IMPLEMENTATION

The program should provide for a comprehensive study of the following basic problems:

- management of maintenance and repair workshops;
- training of maintenance and repair personnel;
- spare parts inventory-control, and production of certain spares;
- centralized repair workshops;
- maintenance and repair programs and schedules

Whereas all of these problems are to be found in almost all the industries, it is thought that the following activities should be given priority because of their impact in the Country's economy:

- Somali Port Authority Workshop;
- O.N.A T Workshop;
- Project for a centralized pilot repair workshop in the Juba District;
- Feasibility study for the production of some of the most common imported spare parts

The Mission suggests that a complete program of implementation should be carried out in a short-term and in a long-term phase.

a) The short-term phase should be carried out by a team consisting of:

- an expert in training problems and techniques;
- a production engineer expert in motor vehicle repair workshops;
- a naval engineer, expert in management of small shipyards;
- an expert in motor-vehicle spare parts and supplies

This team should be given a 12-month assignment to study and provide practical solutions and complete follow-up to selected firms and to some minor workshops. In addition this team should advise on the program for the ensuing long-term implementation phase, with special reference to the projects for centralized repair workshops and for local spare parts production

b) The long-term program should be prepared on the basis of observations and advice given by the short-term implementation team. Though it is difficult at present to give any tentative forecast, it is thought that something like a three-man team would be required for 18 months

- c) Both for the short and long-term assistance, counterpart officers from the main assisted firms and from the Ministry of Industry should be provided, so that they may become acquainted with the methods of tackling this type of problem, and to prepare the nucleus of an experienced staff for a future Management Consulting Center at the Ministry of Industry.

**5. LIST OF APPENDICES**  
**(Classified according to Code ISIC, Rev. 1)**

*Group Appendix*

011	1	S A.G. -- Società Agricoltori Juba
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## THE S A G - SOCIETA' AGRICOLTORI JUBA

*General Manager:* Mr Domenico Di Gennaro

1. This company was created to provide technical, commercial, financial and legal assistance to the banana growers in the Juba District

The district comprises 2,000 ha of banana groves and the output is about 40,000 tons, mostly for export. The new port at Kisimaio has resolved most of the problems which previously existed with regard to exporting, even though some of the equipment still has to be installed, mainly the cold stores

2. There are some 170 growers. Most of them have their own tractors, but the remainder hires from O N A T (see Appendix 19)

In general, the growers use their own - generally inadequate - facilities for the repair and maintenance of their tractors, irrigation pumps and generating sets; or else they use the best-equipped of their co-growers' workshops or the somewhat inadequate facilities of local privately-owned shops. Even the main agricultural machinery supply firms provide very little local assistance and, in the case of major repairs, the growers often have to turn to Mogadiscio (some 600 km away by road, only part of which is "all-weather")

3. The spare-parts supply position also represents a serious problem mainly because of the unfavorable geographical location of the district and the lack of infrastructure. Nor is the situation helped by the lack of standardization on machinery and a poor understanding of the meaning of the word "cooperation", among members of the company
4. Training of maintenance men and drivers generally seems to be poor and the basic operational needs are often met by precarious emergency repairs, and with the personal assistance of the few qualified mechanics available in the district
5. The solution of the most serious of the problems mentioned above would seem to lie mainly in improving the members' understanding of the cooperative concept and in the practical extension of S A G's functions. Even while remaining within the bounds of its constitution, the company could perhaps devote more attention to the technical and human aspects of maintenance covering a fleet of over 300 tractors, 170 trucks, 300 cars and 500 motor-driven pumps



**S.A.C.A. - SOCIETA' AZIONARIA CONCESSIONARI AGRICOLI**

*General Manager: Mr. Mutto*

1. The statutory duties of this company are to provide technical, commercial, financial and legal assistance to the banana growers of the Genale District (Uebi Scebeli).

Bananas are grown on about 6,000 ha, the yearly production being about 60,000 tons, most of which goes for export. At the present time, the fruit is shipped from the port of Merca under very difficult conditions. There is very little equipment at the port and the vessels are not in a very efficient condition (see Appendix 20).

2. There are some 240 growers and around 300-320 tractors. Standardization of age and makes may be considered average. A further 20-30 tractors are available for hire.
3. Schedules for the routine maintenance of these machines are not entirely unknown, but it does not seem that they are followed very rigorously. In general, the growers themselves have few repair facilities, but they can use the services of a certain number of outside repair shops which seem to be fairly well equipped. They can also get service from Mogadiscio which is not too far away.
4. Within the limits of the Country's general possibilities and the general state of the market the spares problem does not appear to be too difficult. Stocks are held in the local stores and at Mogadiscio. Some assistance in this field is also provided by certain sections of S.A.C.A. itself.
5. The impression was gained that the standard of maintenance workers and drivers is on a par with the National average. Thus there is considerable room for improvement. The problem of training is however absolved within the company.

## THE INALSO MEAT PROCESSING FACTORY, MOGADISCIO

**General Manager:** Mr. Enzo Boccedi

1. The company was created in 1962 by a merger with INCA of the Italian STAR group, which now has control. In 1965, the plant was partly renewed and moved to a new location on the coast which was more suitable from the hygiene and industrial wastes disposal aspects

The factory is designed to process 33,000 head per year and is presently operating at 90% of its rated capacity. Its products include corned beef, meat in gelatine and meat extracts, and are mainly exported. The inadequacy of Mogadiscio's port is a large problem.

2. There is an independent workshop on site but this is equipped only for doing the most common repairs, the remainder have to be done by outside shops which are not always in a position to meet all the demands made on them (e.g. in the case of electric motors, stainless steel containers, some types of gearing, castings, etc.).

A maintenance schedule is being drawn up and should shortly be ready. However, that part which has a bearing on health standards is already strictly observed, as is the painting of parts particularly subject to corrosion, a serious problem in this type of industry. The factory shut down for one month per year for a general overhaul.

3. The spares inventory seems to be fairly well controlled. At present, nearly all spares are imported, though a goodly proportion could be made locally if there were a good foundry and a good general engineering shop in operation.
4. The maintenance force (8 workmen out of a total labor force of around 150) gives the impression of being of an average standard but is headed by a well-trained foreman.

## THE KISIMAIO MEAT CANNING FACTORY

*Manager:* Mr. Jama

1. The plant is of Russian make and has a planned capacity of 60,000 head per year. Designed output should be 4,500 tons of canned meat, 1,600 tons of processed meat by-products, 330 tons of sausages and smoked meat, 1,200 tons of rendered fat, 330 tons of tallow and 1,400 tons of bone meal. At the time of the visit, all sections of the installation seemed complete, but the Mission was only permitted to make a rapid tour round the sections. It could well be that start-up will be delayed by the water-supply system not being completed, and that full capacity will not be reached for quite some time because of difficulties in finding sufficient stock for slaughter.
2. An independent repair and maintenance workshop is planned. This is to be fitted out with all the equipment required for the normal demands made by the factory and its vehicle fleet. At least during the first years, it is possible that this workshop may have excess capacity which might be made available to handle outside jobs. A complete maintenance and repair schedule is said to be planned.
3. It is also stated that sufficient spares will be held to cover two years operations.
4. There will be a maintenance staff of 50 out of a total labor force of 450. It is stated that the maintenance staff is to be trained by the firm supplying the equipment.

## THE MOGADISHO DAIRY FACTORY

**Manager:** Mr. Mohammed Haji Giumale-Bill

1. The factory was designed to have a capacity of 20,000 liters per 16 hours. However, since it came into operation in 1966 it has never worked at more than one third this capacity even at peak periods. This is due to the lack of raw material supplies which do not seem to have been given sufficient consideration at the design stage.
2. There is an independent repair and maintenance shop fitted with the machinery necessary for the factory's normal requirements. However, although like the rest of the factory this is newly built, it seems to be in a considerable state of disorder.

The normal procedures for technical and hygienic maintenance seem to be observed. To cope with future needs when production is at a normal level, this workshop will certainly have to receive more care.

3. So far there are no spares problems, apparently because the plant is new and under-utilized. However, as soon as the plant is operating at anything like its designed level, better inventory control and greater attention to the workshop will be needed.
4. At the moment most of the maintenance staff is Russian and was supplied by the firm which provided the plant. In view of the possibilities offered by the local market, training of Somali personnel in the required technical and hygienic maintenance procedures will certainly constitute a serious problem.

### THE SNAI BLIAR FACTORY

General Director Mr. [Name]

Maintenance Director Mr. [Name]

1. This was founded by the Soviet Agency State Concern (SAGS) in 1955. Since then it has been enlarged several times and undergone a number of changes. Today it is a small to medium size modern sugar factory and one of the few real industries in Somalia. The last expansion program (1964-1965) brought the capacity of the factory up to around 1,000 tons of cane per 24 hours day. The yield is around 11% which may be considered satisfactory in view of the low sugar content of the cane. The associated molasses distillation plant has also been enlarged and modernized recently and now has an annual capacity of around 60,000 liters of alcohol monthly reported. Great difficulties due to the past management.

2. There is an independent repair and maintenance shop with a responsible manager. The shop is fitted out with modern equipment and on most of the routine and periodic maintenance needs of the factory and town with its oil tractor, 4 cane cutters and 1000 (1000) tons of cane. During the period when the general overhead is being run the shop has great spare capacity which is often made available to outsiders. During the production period (12-14 days) most the total life span of the factory does not exceed 2-3% for lack of top maintenance and 1% for breakdown.

3. The spare problem is very acute because of the type of machinery involved and it has been further aggravated since the fuel and oil used because of the volume of recovering fuel into required.

Despite capital inventory control capital locked up in spare is not as efficient as 100% of the capital value of the machinery. There are few possibilities of obtaining spare locally apart from some savings for the better the best and other parts of major importance.

4. The maintenance staff were well trained and well managed. It amounts to over 100 workers out of a total labor force which varies between 100 and 200 for the factory and from 1,000 to 1,500 for the town. Facilities is kept low and appropriate training facilities particularly with other coming from their education in a plant training.

**THE NATIONAL BOTTLING COMPANY**

**Manager, Mr. H J Post**

- 1 This is a new plant. It processes concentrated syrups imported from the USA and bottles soft drinks (Coca Cola and Fanta). The output is 30,000 twenty-four bottle cases per month and the plant generally operates one shift a day.
- 2 There is no internal workshop for repairs. Minor repairs are done by the production personnel. It is expected that such larger repairs as may be required in the future will be done by outside workshops.
- 3 The various sections are laid out functionally in a single building. These include a water-softening and potabilization (purification) plant and a steam generator. No maintenance schedule has been prepared.
- 4 Spares have been provided for two years operation. Statistics will be collected to ascertain what future stocks should be held.
- 5 The staff (65 workmen and one foreman) seems to be carefully selected and well disciplined. It has apparently received no vocational training nor, in many cases, any basic education.

**THE BOMALTEX TEXTILE FACTORY**

**General Manager** Mr Zesiecele

**Plant Manager:** Mr Brüggemann

- 1 This is a newly-built installation and will come into operation shortly. The design capacity is 1,500 tons/year of locally produced cotton fiber, with an output of 9.5 million yards of gray, bleached and dyed fabrics. Full production should be reached in 1970, but there is some room to doubt whether supplies of local fiber will be adequate. There are 10,000 spindles and 300 looms installed, and when operating to capacity there would be a workforce of around 500.
- 2 The Mission was received by the Managers but could not be allowed to visit the factory neither given any information because of serious troubles which had required a prolonged police intervention, which was still on.
- 3 From general impressions received and information collected locally, it seems reasonable to assume that the factory has its own fairly well equipped mechanical workshop and sufficient spares for some years operation. It also seems reasonable to think that training the labor force will constitute quite a problem and that, after the first years of operation, the same will be for spare-parts.

**CONCERIA E CALZATURIFICIO DEL VICARIATO**

*Manager* Mr Pozzolino

- 1 This undertaking belongs to the Catholic Mission in Somalia whose training activities have for so long been a great help in the vocational training of the local population. The greater part of the output is absorbed by the Mission personnel.

The tanning section can handle 150 cattle hides and 500 goat skins per day and gives employment to 15 people.

The shoe-making section which provides mainly for the internal needs of the Mission (10,000-12,000 pairs per annum) has a work force of 35. Production is on a craft-type basis and only sewing of the vamps is done by machine.

- 2 The plant and machinery are for the most part old and much of it is in mediocre condition especially in the tannery which could benefit greatly from a well-planned, properly implemented maintenance schedule.

There is no independent maintenance section. When the need arises, assistance is sought from outside workshops.

- 3 Except in particular cases, there are no serious spares problems since most items can be found fairly easily on the market, or made locally.
- 4 Vocational training in maintenance generally seems to be of a mediocre standard, especially in the tannery, owing to the particular conditions under which it operates.



### **MOBILIFICIO MISSIONE**

**Manager: Mr Morandi**

- 1 This enterprise belongs to the Catholic Mission. It produces a certain variety of wooden furniture and decorative items mainly on a craft basis. The bulk of the production is used to satisfy the requirements of the Mission's internal interests and the remainder is marketed locally. The enterprise gives employment to 20-30 people.
- 2 The equipment consists of woodworking machinery laid out in a spacious building where other operations are also pursued.
- 3 It seems that apart from cleaning the machines occasionally no other maintenance is done.
- 4 There is a limited stock of spares consisting exclusively of tools for the machines. Other parts are imported as and when the need arises.
- 5 The staff consists of Somali artisans who have learned their craft on the job. Their productivity seems reasonable.

**BOPLAST**

**Owner Mr Santini**

- 1 The company has been in operation since 1967 and produces furniture from thermoplastic resins, and bagasse chipboard. Although it employs some 70 workmen it is run on typical family lines with characteristic energy and personal initiative, but is completely lacking in organization
- 2 The layout is irrational and the little space available is poorly used. Apart from the machinery for the production of chipboard, the remainder of the machines and equipment are in poor condition. Because of the variety of types required by the market and the limitations of the market itself, many operations are performed by hand
- 3 There is no maintenance shop and all repairs of a certain size are done by outside shops. There is no maintenance schedule
- 4 Apart from a few special spares, the stock of which is often critical, there are no particular problems, and needs are generally met, albeit at elevated prices, by the local market and by local workshops
- 5 The poor standard of training of the personnel means that the owner and his assistant have to be extremely vigilant

### **FALEGNAMERIA SCUOLA ARTIGIANATO**

**Manager: Mr Bogo**

1. The Scuola Artigianato was originally created as a center for training artisans in various trades. Then, of necessity, it became a production workshop, although it still continues to do some training.

At the present time it consists of a carpentry shop and a department which carries out small building jobs including electrical and plumbing installations (50 workers in all)

2. The Mission concentrated its attentions on the carpentry which is the one manufacturing activity which comes within the groups of specific interest to the survey. This shop produces wooden articles which are installed or used in buildings owned by the Catholic Mission in Somalia. It provides employment for 15 people.
3. The machinery is old and is laid out without any apparent order. It appears to be poorly maintained and indeed there does not seem to be any maintenance program.
4. There is a small spares store, almost exclusively tools used by the machines. The other spares are imported as and when necessary.
5. The staff was trained on the job and has been with the shop for many years. Their training seems to be sufficient though the individual output is low.

### THE VECCO OIL MILL

*Manager:* Mr. Giorgio Vecco

*Chief of Maintenance:* Mr. Rino Rossetti

- 1 The plant has a capacity of 600 kg/hour of seed-oil. The plant is extremely under-utilized, operating only 1,000-1,200 hours per annum. However, it is the only oil-pressing plant of any size in Somalia which operates at a certain level. It is worth noting that at the present time, the Country imports a good part of its edible oil requirements and that this situation could be much improved if only a different tax policy were adopted on oil seed imports. However, the local production of raw materials is said to be in a good phase of expansion.
- 2 Since this is only a small plant, there is no repair workshop in the strict sense of the word. Although the machinery is old, it seems to be in a reasonable state of repair and there are not many maintenance problems.
- 3 There are apparently no spares problems worthy of note.
- 4 The staff totals 5 workmen and a foreman. They not only look after production but maintenance too, including the upkeep of a small diesel-electric generating set.

**I.C.S. - INDUSTRIE CHIMICHE SOMALE**

***Manager:*** Mr. Hirei Gassem

1. The plant has only been in operation for two months. This company is engaged in the preparation and packing of powdered detergents, imported in granular form.

At the moment the work force numbers 15 and one shift a day is being operated while assessing market reaction.

2. The plant is extremely simple and the only machinery used is that for grinding the granules.
3. As will be appreciated, there are no problems of maintenance, spares or training at the present time

## THE FERSOMALA IRON MILL

*Manager:* Mr. Del Bon

- 1 The plant is designed for the production of concrete reinforcing bars (1.25 tph as referred to a basic diameter of 10 mm)

The rolling mill is of a very old type. It was bought second-hand in 1963 and installed in 1965 after a general overhaul. The same is true of the furnaces and the two generating sets.

After some years of economic and financial difficulty, the mill was restarted in 1967 using supplies of Russian billets provided at prices well below those prevailing on the open market. The economics of the operation have recently improved with the reduction of import duties on oil products for industrial use.

- 2 There is no repair and maintenance workshop. The personnel which looks after the generating sets sees to emergency repairs, and the more demanding repairs are carried out by small local workshops, though not without difficulty. For the really large repair jobs, use is made of the facilities available at the workshops of the two main local concerns (SEIS and SNAI).

Knowing full well the precarious state of the plant, the Management keeps a very close eye on the generating sets and on the electric motor which drives the rolling mill. However, in view of the conditions under which the plant is expected to operate (semi-desertic) even greater care and a systematic maintenance schedule are really required.

- 3 All the main spares are imported, and in view of the company's financial difficulties it is impossible to carry sufficient stocks.
- 4 The maintenance staff consists essentially of the chief mechanic and the chief electrician at the power station who cannot, however, count on a sufficient number of adequately trained assistants.

**FIAT - SOMALIA S p A.**

*General Manager* Mr Carlo Guerrien

- 1 This is a company with mixed share capital. It holds the main agency for Fiat sales in Somalia and has a good repair shop and what is generally a well-stocked spares store, in Mogadiscio.

Apart from the Mogadiscio shop, there is also a good repair shop in Scialambot run by the CIEFFE (Cavazzini and Ferracuti) subagency, to provide better service, especially for tractors. This subagent also runs another small workshop in the Kisimaio area where it seems that a second auto agency with better repair and service facilities will be set up in the future.

- 2 The layout of the Mogadiscio shop is functional. There is a good range of machinery and a good maintenance organization.
- 3 The spares store, which also supplies outside workshops, seems well-stocked and rationally organized. Distribution to clients however, presents some problems, mainly because of imprecise ordering. More widespread distribution of spares price lists and some assistance to outside shops on the fundamentals of vehicle overhauls and spares ordering would be a great boon.
- 4 The bulk of the staff is Somali. Great care is given to both theoretical and practical aspects of training.

### THE CONZ WORKSHOP, MOGADISCIO

*Owner:* Mr Conz

- 1 This workshop concentrates on engine repairs, especially crankshaft regrinding, rebores, block and head grinding, etc

This is a typical family firm and is the only shop in Mogadiscio indeed, in the whole of Somalia - equipped with highly specialized machinery. As such, it has an absolute monopoly in this field

- 2 The shop is well laid out and the premises are spacious. The machinery is in first-class condition and the technical organization is very efficient
- 3 The staff is carefully selected and trained, but even so it represents an important limiting factor for the shop's activities. Indeed, the proprietor has stopped taking on unskilled workers who require a long training period and then often leave as soon as they have acquired sufficient skill

It is not thought that the productive capacity of the shop is used to more than 25%, if referring to a 2-shift operation



### CIEFFE S.p.A. (Previously Cavazzini and Ferrarotti)

Owner: Mr. Cavazzini

1. This is an important industrial undertaking with H.C. in S. Colomba. The company is active in many sectors. Apart from having the Fiat subagency and providing technical assistance to the Genoa agricultural district vehicles, it is also engaged in land reclamation work, maintenance of the irrigation network, civil works in steel flanking stages, river bridges, etc., and the production of various mechanical components against drawings or sample.

The company has 22 Caterpillars and 7 Fiat AD's for its own use and also for hire.

2. The general layout is reasonably functional. There is sufficient space available and the company's operations are imbued with a certain order.

3. The workshop layout is satisfactory and allows an orderly workflow. There appears to be sufficient machinery and this is kept in good order despite the fact that there are no specific maintenance schedules. There is also a small furnace for heat treatment of metals.

Work preparation, distribution and control is done in fairly efficient lines, although further work needs to be done to improve the system.

4. There is a separate store for vehicle and tractor spares. This is run in an organized form and kept in reasonable order. A good stock of fuel spares is kept. However, better inventory control and better communication with the stores in nearby S. Margherita would in fact lead to a reduction in the capital tie up in spares.

5. The staff consists of a number of Italian engineers, 16 Italian skilled workers including the foreman and some 200 workers including tractor drivers and laborers.

Training of staff cannot be considered to be completely satisfactory but the employees manage to do their jobs reasonably well thanks to the good organization and the conditions provided by the skilled hands.

**FOOD ON A WORLDWIDE BASIS - AN AMERICAN NATIONAL SECURITY MATTER**

From [Name] and [Name]

This is a State company. It was set up in 1953 and is operated with the aid of Russian technicians. It has 150 tractors and a number of other machines of Russian make mainly. The company is engaged in buying out tractors and farm implements.

The Head Office is in Moscow and there are Branches in Leningrad, Tashkent, Gorky, Baku, Brest, and Harbin. A large amount of the Moscow and Leningrad designs.

The Moscow office has a few percent of machinery in a number of other regions but it is not in every region. A few more design with a view to forming a network of similar companies.

There is no real concentration of funds either in the form of design machinery or in the form of the tractors and in the form of a general suggestion.

Such regional offices are established and reports are taken with a view to the judgment of the Moscow office only in the form of a general suggestion.

There is a certain amount of work in the region and in the form of a general suggestion which is based on the most immediate work.

The industrial level of the present 10 Soviet design office and the upgrading is difficult due to the lack of raw materials. There is no industrial machinery through Moscow but there are the Soviet design office apparently the results. However in the field the upgrading is very much reduced.

Conditions of the Leningrad office give the impression of being much worse. There there is a fleet of 10 tractors of a type which is average about 10 of which are under repair and a number of conditions which make them unusable.

Design facilities are extremely limited and there which is not even a good state. There is no real suggestion. The general design is a lack of complete design and few parts are made. The industrial level of the production and the facilities including direct office apparatus poor.

There is also a certain amount of work in the region and in the form of a general suggestion which is based on the most immediate work.

### THE FEDERAL BUREAU OF INVESTIGATION

#### Memorandum for the Director

The following report is a summary of the results of the investigation conducted by the Special Agent in Charge, [Name], at [Location], on [Date]. The investigation was conducted in accordance with the instructions of the Director, Bureau of Investigation, Department of Justice.

The investigation was conducted in accordance with the instructions of the Director, Bureau of Investigation, Department of Justice. The results of the investigation are summarized in the following paragraphs.

Generally, it is noted that the results of the investigation are as follows:

The [Name] and [Name] of [Location] are [Name] and [Name] of [Location]. The investigation was conducted in accordance with the instructions of the Director, Bureau of Investigation, Department of Justice.

The results of the investigation are as follows:

### THE LOV ASEN WORKSHOP

1. This is a small mechanical workshop which carries out commissions on behalf of clients to their verbal instructions and to their designs. Its main business is in the repair and substitution of spares for vehicles.

The shop has a good reputation and is considered one of the best as regards the care and precision with which it operates. It is almost full to capacity and often has to turn down orders on days after long term delivery.

2. The workshop is extremely cramped for space and the proprietor is considering extending his premises. The present layout is reasonably satisfactory. The shop is well equipped with machine tools in a good state of repair and there is also a fair range of measuring instruments and non-measuring tools.

3. The proprietor states that there is some difficulty in obtaining certain materials on the local market, especially special steels. He is also acutely aware of having no heat treatment facilities, often as necessary for doing a really good job.

The workshop has a fair stock of raw materials and of fabricated materials stored in an orderly fashion.

4. Outside the limits permitted with such a relatively small firm, certain organizational procedures are operated and a useful amount of technical and administrative information is collected.

5. There are 12 well trained mechanics employed under the direct control of the proprietor. Even on the most difficult work the most demanding jobs.

**THE FRATELLI DEL BON WORKSHOP**

- 1 This workshop concentrated mainly on structural steelwork (small sheds, metal fixtures, stationary and mobile storage tanks, etc.), and recently undertook a contract for the assembly of a batch of trailers. The company provides employment for some 40 or 50 people.
- 2 The layout is irrational and much of the work is done in the open. There is not enough machinery and what there is gives the impression of being in a poor state of repair. Much of the work is done personally by the proprietors or with their continuous assistance. There is little or no organization.
- 3 With few exceptions there are no spare problems, but there are difficulties in the supplies of raw materials especially good quality materials for structural steelwork and reservoirs.
- 4 The work force is on a par with the National standard i.e. not very advanced. However the personal intervention of the proprietors helps overcome these shortcomings and the level of know-how is gradually rising.

### OTHER WORKSHOPS

Apart from the workshops mentioned which should take in those of major technological and economic significance there are a number of small-scale or even one-man shops. It seems necessary to point out the presence of these, since on the one hand they indicate the existence of a demand which is not satisfied elsewhere and on the other the tendency for the lower levels of the Somali and immigrant population to become integrated in the Country's economic development process, thus providing the basis for future infrastructural services.

These shops include not only a very small old cast-iron and non ferrous alloy foundry which has gone downhill badly in recent times since the old owner retired but also a number concentrating on lathing jobs, as well as some modest auto-repair enterprises.

As stated, the technical and economic importance of these shops is certainly not great at the moment. But their very existence is worthy of note from the social aspect and because of the fact that these small-scale entrepreneurs and unassuming workers have shown interest in getting ahead when the Government offers them the opportunity to do so by opening suitable training centers.

**S.E.I.S - SOCIETA' ELETTRICA ITALO SOMALA**

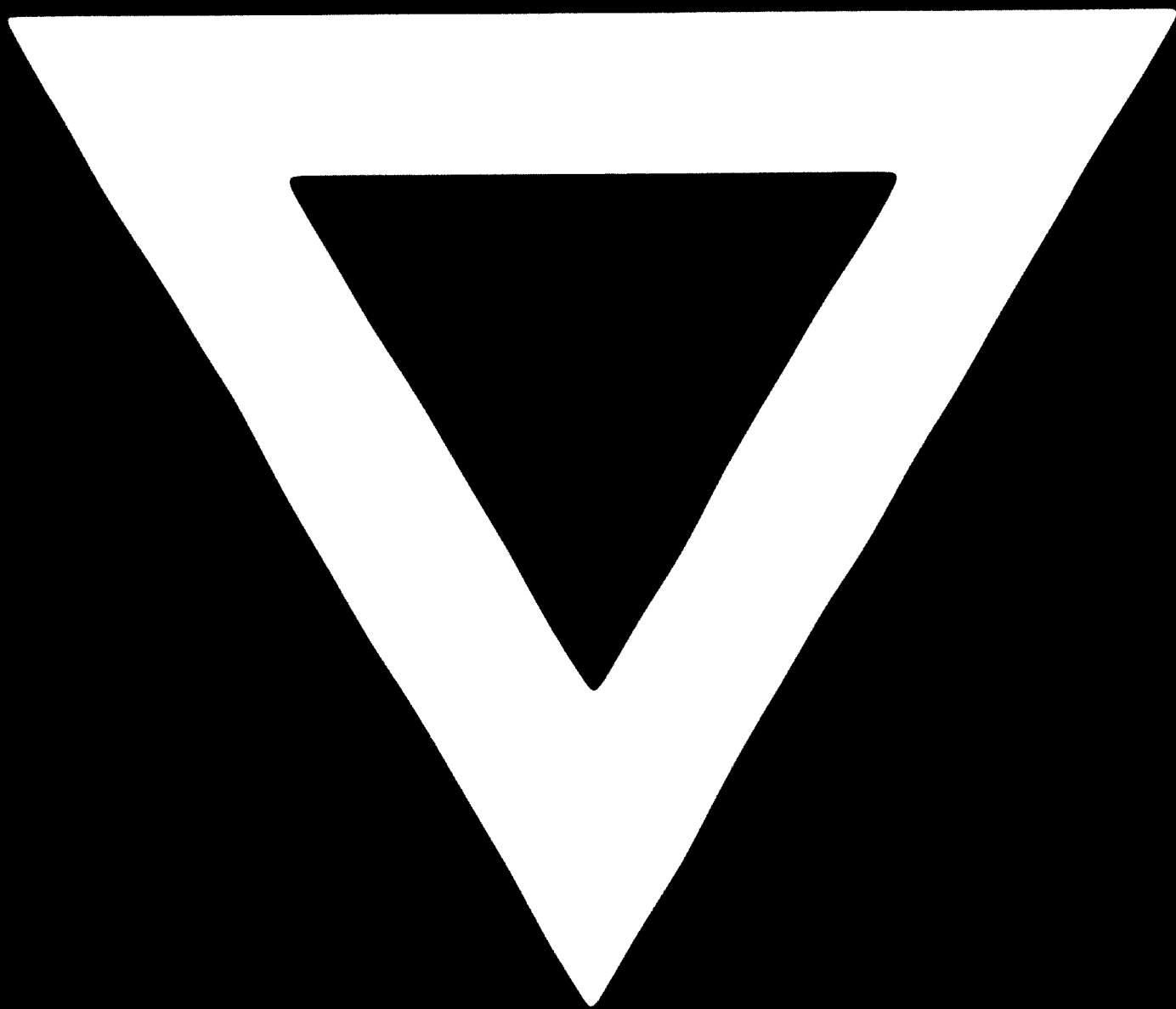
*General Manager* Mr. Gaetano Marini

1. S.E.I.S. generates and distributes power in the Mogadiscio area. Its plant consists of one 3,800 HP Deutz generator installed in 1968, four 1,370 HP Deutz generators installed between 1959 and 1965, and three old Tosi generators with a total rating of 1,100 HP (now as stand-by). A new station with four 2,600 HP generators is planned for 1974.
2. There is an independent repair and maintenance section with a responsible manager. This is fairly well equipped to meet all internal needs. It also appears to have excess capacity which is freely made available to local firms for repairs which would not otherwise be done locally.

The generators are regularly overhauled and the maintenance schedule is rigorously followed. The layout of the machinery in the workshop is acceptable and the machines themselves seem to be in a good state. The organization appears good both from the technical, administrative and general aspect.

3. The spares problem seems to be in hand through good inventory control even though keeping the required stock of spares is a very costly business because of high customs dues and the excessive purchase-leading time, especially since the Suez has been closed. Some spares which are not too complicated are made in the workshop or are contracted out. Indeed even very difficult repairs are done locally when spares are not available.
4. Despite the fact that the local labor market does not have much to offer, the standard of the staff is reasonably good. This result has been achieved through careful periodical selection and gradual but thorough on-the-job training under the supervision of the management.

**1 - 560**



**81.08.24**