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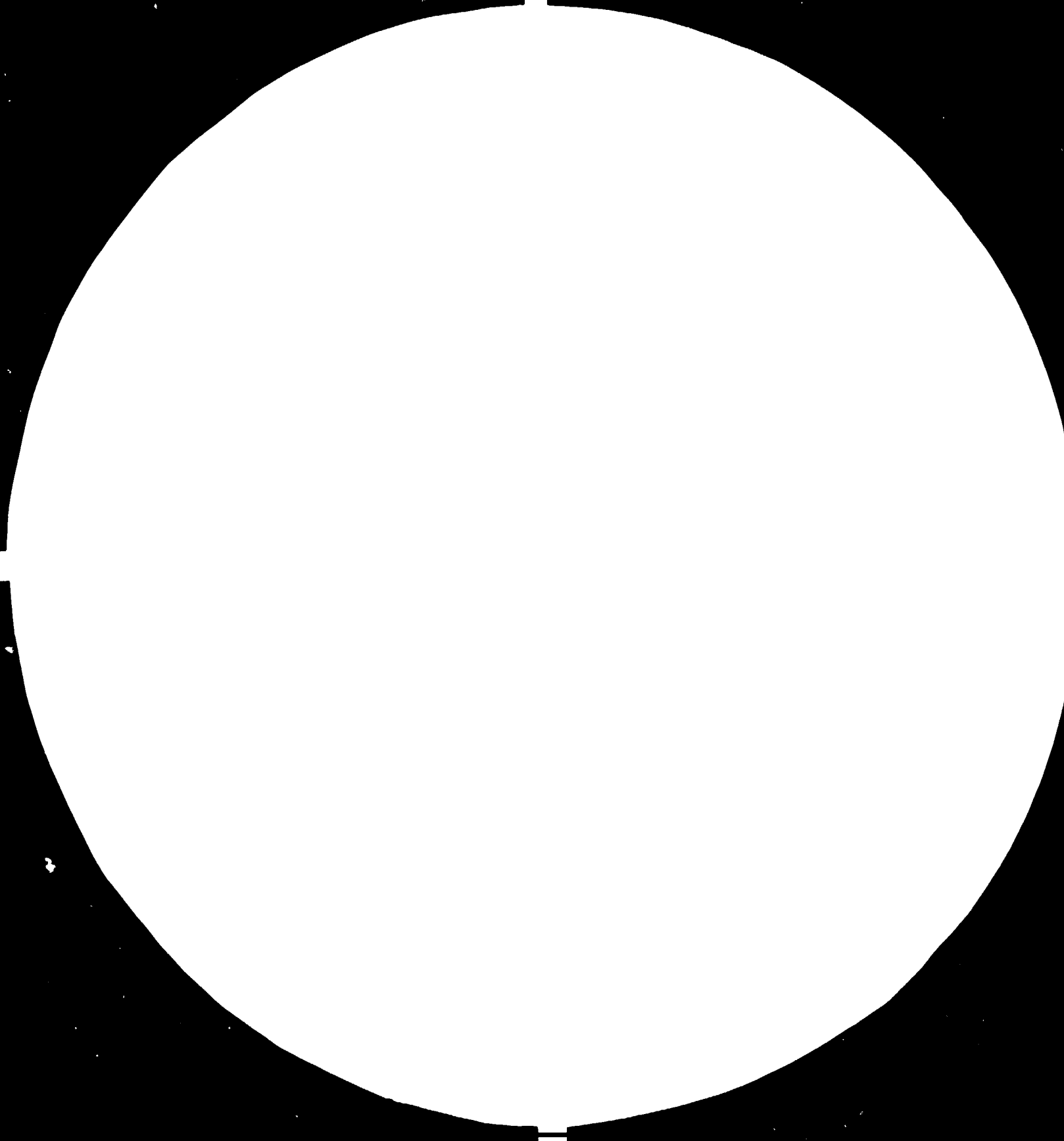

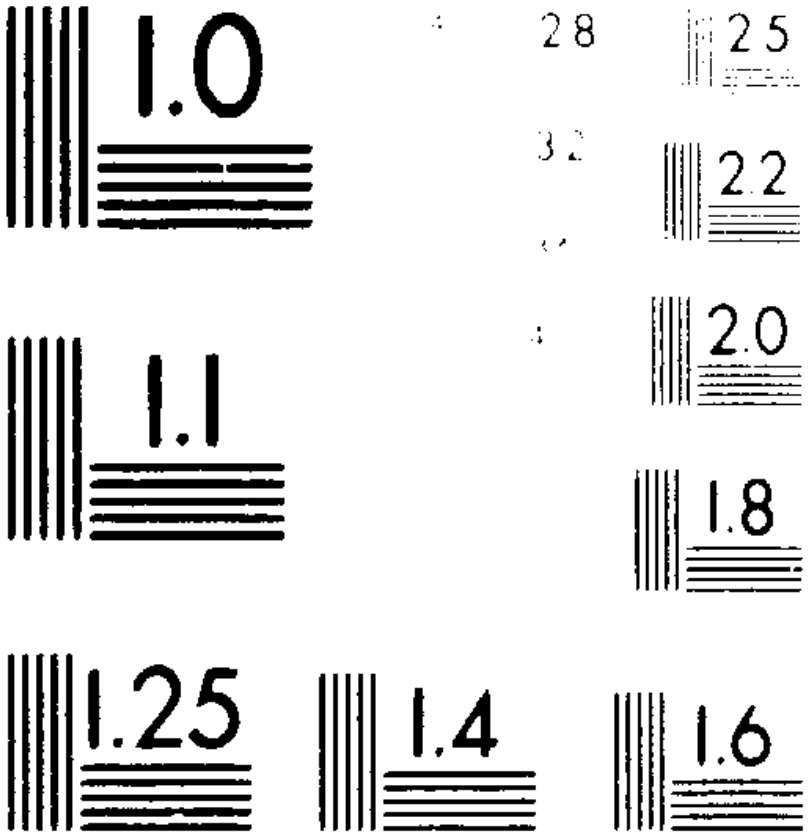

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UNITED NATIONS
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ENGLISH

REHABILITATION AND DEVELOPMENT OF THE BAKERY INDUSTRY

TF/MOZ/82/002

MOZAMBIQUE

Technical report*

Prepared for the Government of the People's Republic of Mozambique
by the United Nations Industrial Development Organization

Based on the work of Mr. Francesco Vicentini,
Expert in Mechanical Engineering
(Specialized in the Establishment of Bakeries)

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I. INTRODUCTION

There is a well established milling plant in Maputo both for wheat and corn. However, the actual activitiy is far below the installed capacity due to the shortage of raw materials to be milled.

In the country, there are two yeast factories, one being in Maputo which produces only fresh yeast and the other one located in Beira which can produce both fresh and dry yeast. Only the Maputo factory is actually operating and at a low level. The main reason is the state of the equipment which is very old and the lack of spare parts.

There are various small, old-fashioned bakeries, mostly obsolete.

The combination of the above elements, shortage of raw materials, inefficient production of yeast and small bakeries, result in the irregular production and distribution of bread which is far below the needs of the City of Maputo in quantity and quality.

II. FIELD OBSERVATIONS

The expert visited the factory of the Compania Industrial de Matola, comprising milling (wheat and corn) and macaroni factory. He also made assessments in the SIPAG Factory producing fresh yeast and in various private bakeries located in Maputo.

He finally made observations concerning the food distribution in Maputo and discussed the subject with Mr. Amos Junior Natsinhe, Director of the Government Agency in charge of food distribution in the city of Maputo.

III. RECOMMENDATIONS

The shortage of raw materials and the acute need for increasing bread production should be solved through short, medium and long-term measures. A bakery should immediately be established

on the premises of the Matola industry in order to reduce to a minimum, the wastage of wheat and to maximise the use of yeast. The actual distribution of small quantities of wheat flour and yeast to a large number of small bakeries, is the cause of increasing losses. Therefore, by means of centralizing the production it will be possible to increase the quantity and quality of the final products.

The establishment of one industrial bakery with a capacity of about 1,000 kg/hour, is therefore recommended. Parallel to that, a specific programme to rehabilitate both yeast factories should be implemented.

The second phase after the complete rehabilitation of the yeast factories and full production of the industrial bakery, should be of an expansion nature which would require the modernization of the private sector small-size bakeries and establishment of a new yeast factory.

The long-term actions are essentially dependent upon the agricultural development in order to produce bread and other cereal products with composite flour making use of locally-produced cereals and roots to replace imported wheat.

IV. THE NEW RECOMMENDED BAKERY

The new (1,000 k/h) bakery will be established in the available space at the premises of the Compania Industrial de Matola in Maputo. This will integrate the new production unit with the milling plant, which was recently rehabilitated and is adequate to produce the required wheat flour. The integration will also make available to the bakery:

(i) the existing laboratory for quality control of raw materials and final products;

(ii) the well equipped workshop for repair and maintenance; and

(iii) capable staff who can easily be trained to manage and operate the new plant.

It should be pointed out that also a macaroni plant will be established on the same premises of the Matola industry which will allow larger and better integration. The existing building is suitable for the installation of the new bakery and the only point the expert recommends is to check if the existing floor would resist the weight of 6,800 kg. distributed as follows, according to the respective areas:

-	Mixer	1,800 kg/m^2
-	Proofing chamber	1,000 "
-	Oven loading group	1,500 "
-	Oven unloading group	1,500 "
-	Oven zone	1,000 "

In order to establish the bakery as required, the following aspects should be considered:

(a) The available space is of 66mts. length and the width among the pilasters is 9 mts. Therefore the electric oven must be constructed on the width of the baking chamber of 2.10 mts. (outside of the oven - 3 mts.) so as to allow also the installation of the second line (in the future) with a free passage between the two ovens of about 2.50 mts. sufficient for maintenance and the easy replacement of the electric radiators (see layout - Annex IV).

(b) The plant should have two silos with a total of 76 m^3 of storage, equal to 440 q. of flour which corresponds to the exigencies of the production plant, assuring a supply for two days for one line and for one day for two lines as follows:

- Production per hour: 1,000 kgs of baked bread
- Flour necessary : 800 kgs.
- 800 x 24 hours = 19,200 kgs/day

According to the diagram attached (Annex V), the plant would have an automatic weighing and feeding flour system from the milling to the silos loading, storage and then to the mixer tank. It should be pointed out that part of the required silos could be locally produced.

(c) The Compania Industrial de Matola has all the equipment needed for quality control, except a small-size mixer and oven which should be installed to produce samples of bread at pilot scale.

(d) One auxilliary cooling water device should be installed with a capacity of 400 ltrs. This is required in order to keep the mixing water at a temperature not higher than 10°C.

(e) The list of equipment needed is attached as Annex I.

V. ESTABLISHMENT AND TRAINING

The establishment of the plant which will require about thirty working days of a mechanical engineer, one electrician for fifteen days and two workers for thirty days each should be provided by the equipment suppliers. The same applies to four months training abroad for an operator.

VI. PERSONNEL MET BY THE EXPERT

Mr. C. Goulart	Senior Industrial Development Field Adviser, UNIDO
Mr. A. de Almeida Matos	General Manager, Unidade de Direçao do Ramo Alimentar (UDRA)
Mr. Cornejo Rojas	Unidade de Direçao do Ramo Alimentar
Mr. Cardoso Tomas Minendane	Industrial Director, Compania Industrial de Matola
Mr. J. Alberto Frechant	Chief of Repair and Maintenance, Compania Industrial de Matola

ANNEX I

LIST OF EQUIPMENT AND GOODS

A. PRODUCTION PLANT

1.	1	Water mixer and meter, adjustable for cold and normal water
2.	1	Spiral mixer extractable bowl, capacity 240 Kg/h
3.	4	Bowls for above said mixer, capacity 240 Kg
4.	1	Elevating-tilting device of bowl
5.	1	Dough dosing hopper
6.	1	Connected group of machine "Multipan" type (divider, laminators, cutting machine; moulder).
7.	1	Automatic loading device of loaves on the trays.
8.	1	Set of trays necessary for the proofer
9.	1	Set of trolleys for above mentioned trays
10.	1	Proofer. Supply of doors and air handling unit. The walls will be built by the customer on site, according to the drawing to be supplied.
11.	1	Automatic loader of oven, with bread transfer from trays to oven wiremesh.
12.	1	Automatic electric oven: - baking surface: 73,50 m^2 - working length: 35 m - working width: 2,10 m -
13.	1	Taking conveyor of bread from oven.
14.	2	General control panels
15.	1	Set of moulds for tin bread of 400/800 g
16.	1	Set of trolleys for the above mentioned moulds
17.	1	Slicing machine for tin bread

B FLOUR PLANT

1.	1	Bags emptying hopper
2.	1	Centrifugal emergency sifter
3.	1	Motorized valve
4.	1	Pneumatic group under pressure for silos loading
5.	1	Pipes, diameter 100 mm. Necessary quantity
6.	-	Set of accessories for 2 silos: - 2 inspection openings on top - 2 inspection openings at bottom - 2 safety valves on the cover - 1 set of flanges for pipes - 4 level indicators - Vibrating extractors
7.	2	Screw motorized dosers
8.	1	Centrifugal sifter, motorized
9.	1	Fluidizing valve, motorized
10.	1	Pneumatic group, under pressure, for flour transport and feeding to the weighing system
11.	1	Steel pipes - diameter 100 - necessary quantity
12.	1	Motorized rotating valve
13.	1	Weighing tank, with scale with rotary reading, possibility of calling of 2 components with 1 preset formula.
14.	1	Dedusting and filtering group, complete with filters, valves, electrofan.
15.	1	General control panel with synoptic panel.
16.	1	Pushbutton for scale unloading.

C. CHEMICAL LABORATORY

1. 1 Mixer for bread, 5 Kg capacity
2. 1 Electric oven with 1 baking chamber - surface of 0,5 m^2 approx. Complete with proofer.

D. ANCILLARY EQUIPMENT

1. 1 Automatic scale for sacks, capacity up to 300 Kg, floor type, for mixing room.
2. 1 Automatic scale for baskets, capacity up to 50 Kg, with platform and rollers, to weigh baked bread.
3. 1 Roller conveyor of 10 m
4. 1 Industrial refrigerating unit for mixing water, capacity 400 l
5. 1 Steam generator - capacity 200 Kg/h
6. 2500 Plastic baskets for bread storage, dimensions: 690x460x380 mm
7. 2 Manual transpallets, capacity 1400 Kg
8. 1 Wooden pallet as a sample
9. 1 Air compressor
10. 1 Final conveyor to trasfer the bread from the first floor to the ground floor.

- Set of spare parts

4 FIAT TRUCKS, DUCATO 10 type, gasoline engined, 1800 cm^3 - 69 Hp

PRICES AND TERMS

Price : F.O.B.

1	SEMIAUTOMATIC BREAD LINE	USD.	434.000
2	AUXILIARY PRODUCTION MACHINERY	USD.	67.000
3	FLOUR PLANT	USD.	75.000
4	LABORATORY	USD.	2.000
5	ANCILLARY EQUIPMENT	USD.	75.000
6	SPARE PARTS	USD.	30.000
7	4 FIAT DUCATO 10 TRUCK	USD.	50.000
	Estimated freight to Maputo ..... (foreseen 10 containers of 20')	USD.	35.000
	TOTAL C&F PRICE	USD.	768.000

Erection and start-up:

..... USD. 28.000

At client's charge: board and lodging, all travel expences and pocket money, in local currency, equal to at least 10 U.S.DOLLS/day for our technicians, and eventual medical taxes and/or charges, which could become necessary during the stay of our technicians at the Client's.

Training:

..... USD. 35.000

At client's charge: board and lodging, all travel expences and pocket money, in local currency, equal to at least 10 U.S.DOLLS/day for our technicians, and eventual medical taxes and/or charges, which could become necessary during the stay of our technicians at the Client's.

ANNEX III

REPUBLICA POPULAR DE MOÇAMBIQUE

CONSELHO EXECUTIVO DA CIDADE DE MAPUTO

GABINETE DE ORGANIZAÇÃO DO ABASTECIMENTO DA CIDADE DE MAPUTO

LISTAS DE PADARIAS DA CIDADE DE MAPUTO

	Cap.APROX. DIÁRIO -SACOS	FORNOS QUE POSSUI	OBS:
1 -Padaria Aliança	120	2.Formas a lenha	
2 - " Europeia	120	2. " " "	1 carvão Mineral
3 - " O Pão Nosso	120	2. " Metálica e "	
4 - " Flor do Benfica	90	2. " a lenha	
5 - " Cristal	120	1.Disel 2 lenha	
6 - " Santa Isabel	90	2.Metálica e lenha	
7 - " Central	90	2. a lenha	
8 - " Lafões	120	3. a lenha	
9 - " Confiança	90	2. a lenha	
10- " Moçambique	120	2. a "	
11- " Spanos	120	2. 2 "	1 carvão Mineral
12- " Pão Quente	120	2. a "	
13- " Rialto	120	2. Metálica lenha	1 a disel
14- " Bijou	150	4. a lenha	
15- " Triunfo	120	2. a "	
16- " 3 Rosas	120	2. a "	
17- " Império	90	2. a "	
18- " Victória	90	2. 2 "	
19- " Estrela Matola	90	2. a "	
20- " Bayete	90	2. Metálico lenha	
21- " Alto Maé	90	2. a lenha	
22- " Sameiro	120	2. a "	
23- " Pão Bom	120	3. a "	
24- " Aveirense	90	2. a "	
25- " Moçambicana	120	2. Metálica e lenha	
26- " Mahotas	90	2. a lenha	
27- " Popular	120	1. Metálico	1 carvão Mineral
28- " Celeste	10	1. a lenha	
29- " Manhana	120	2. a "	
30- " Matola	120	2. a "	

REPÚBLICA POPULAR DE MOÇAMBIQUE

CONSELHO EXECUTIVO DA CIDADE DE MAPUTO

GABINETE DE ORGANIZAÇÃO DO ABASTECIMENTO DA CIDADE DE MAPUTO

	Cap.Aprox.Li-Ário Sacos	Fornos que Possui	OBS:
31- Padaria Serrano	120	2.a lenha	
32- " Maxaquene	40	3." Gás	
33- " Machava	90	2." lenha	
34- " Maziz	90	2." "	
35- " Lisboa	120	2.Metálico a lenha	
36- " 25 de Junho	120	2. a lenha	
37- " Zanette	90	2. " "	
38- " Malhangalene	120	2. " "	
39- " Escola Benfica	120	2. " "	1 a disel
40- " Edgar	120	1. " "	1 Eléctrico

TOTAL:

NOTA:- Fornos a lenha referidos, são fornos tradicionais feito pelo tijolo de Barro.

A capacidade calculada é aproximadamente e que pode ser superior porque é feito brucraticamente sem consultar os proprietários dado o carácter da solicitação.

Fornos a carvão mineral não funcionam por falta de carvão.

de Maio de 1984

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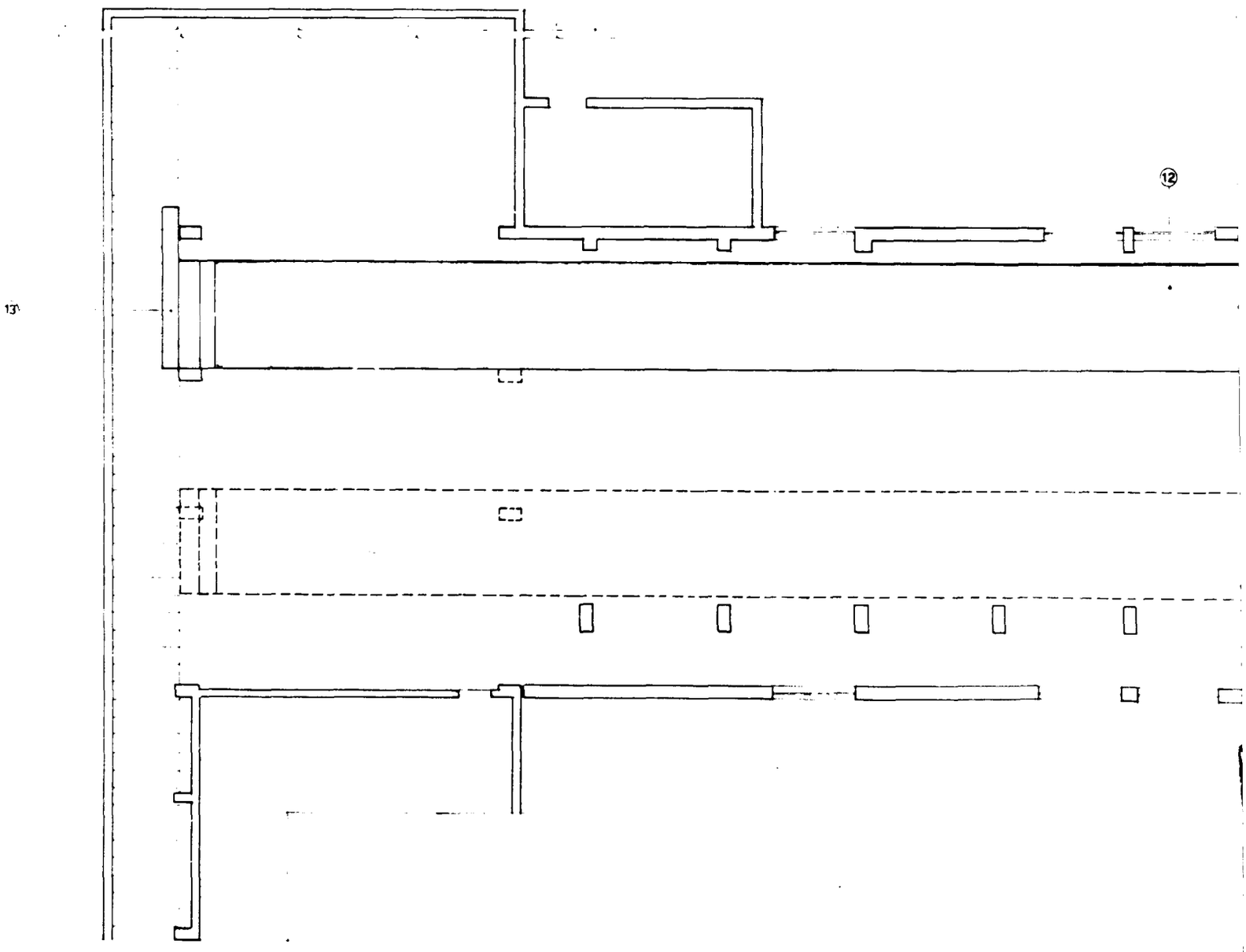
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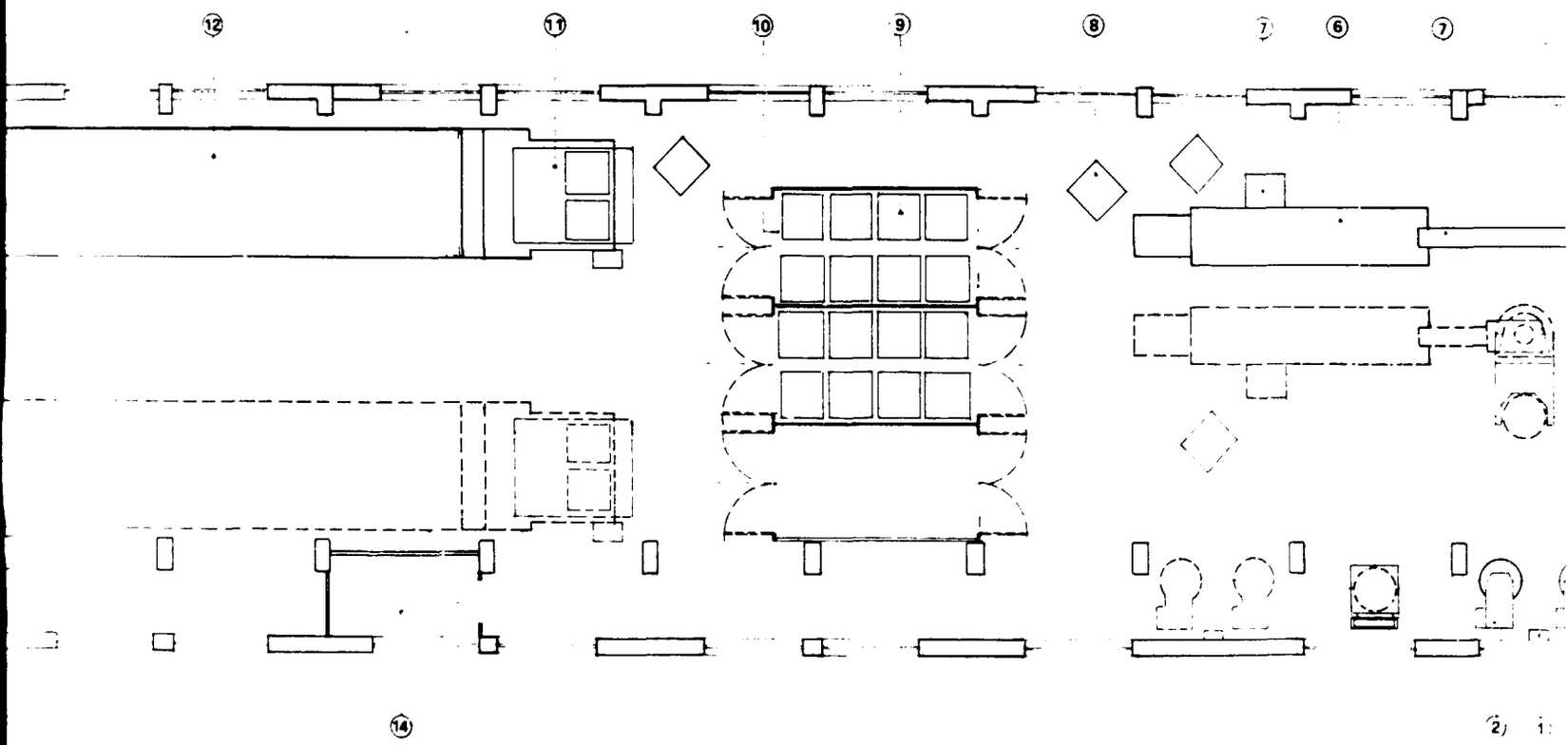
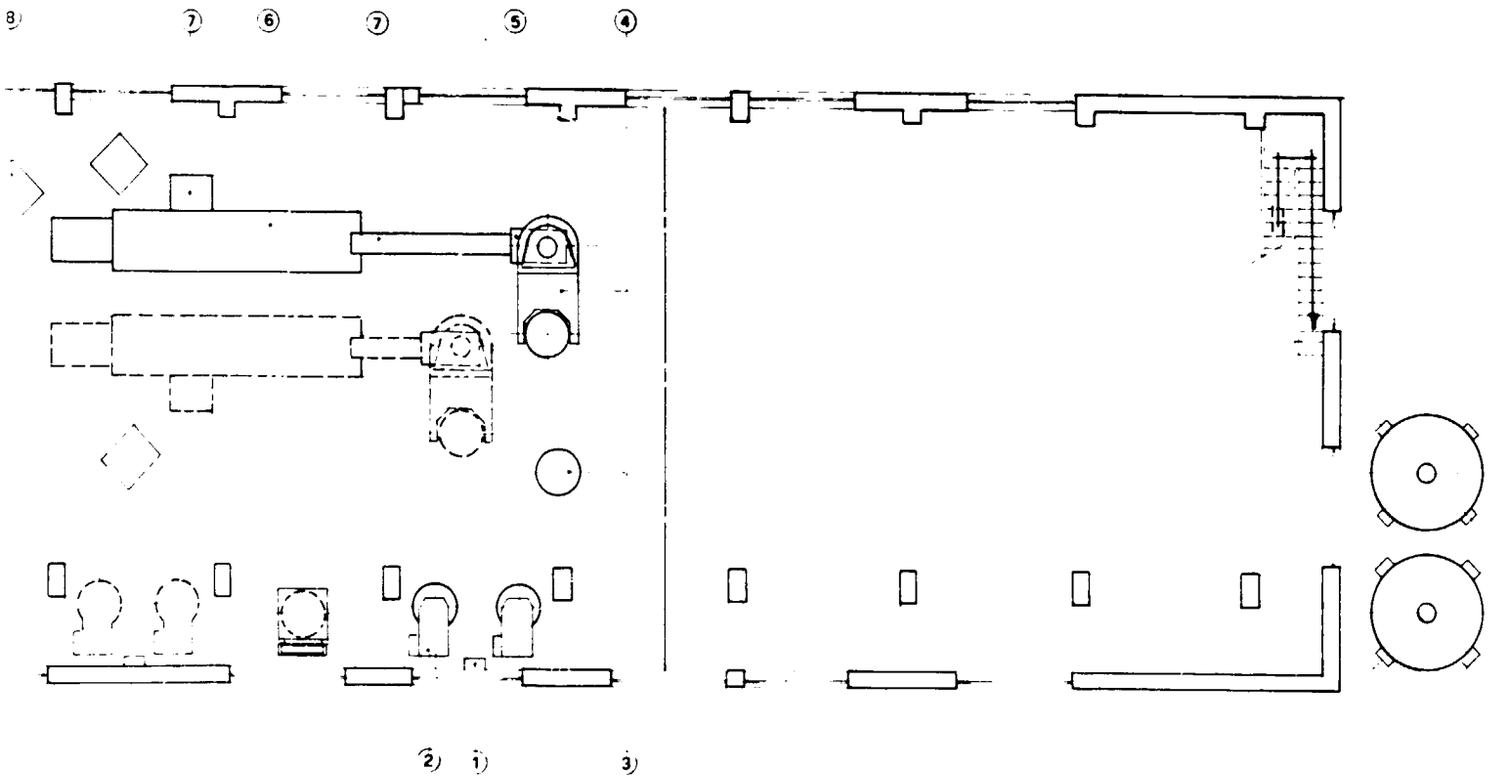
ANNEX IV

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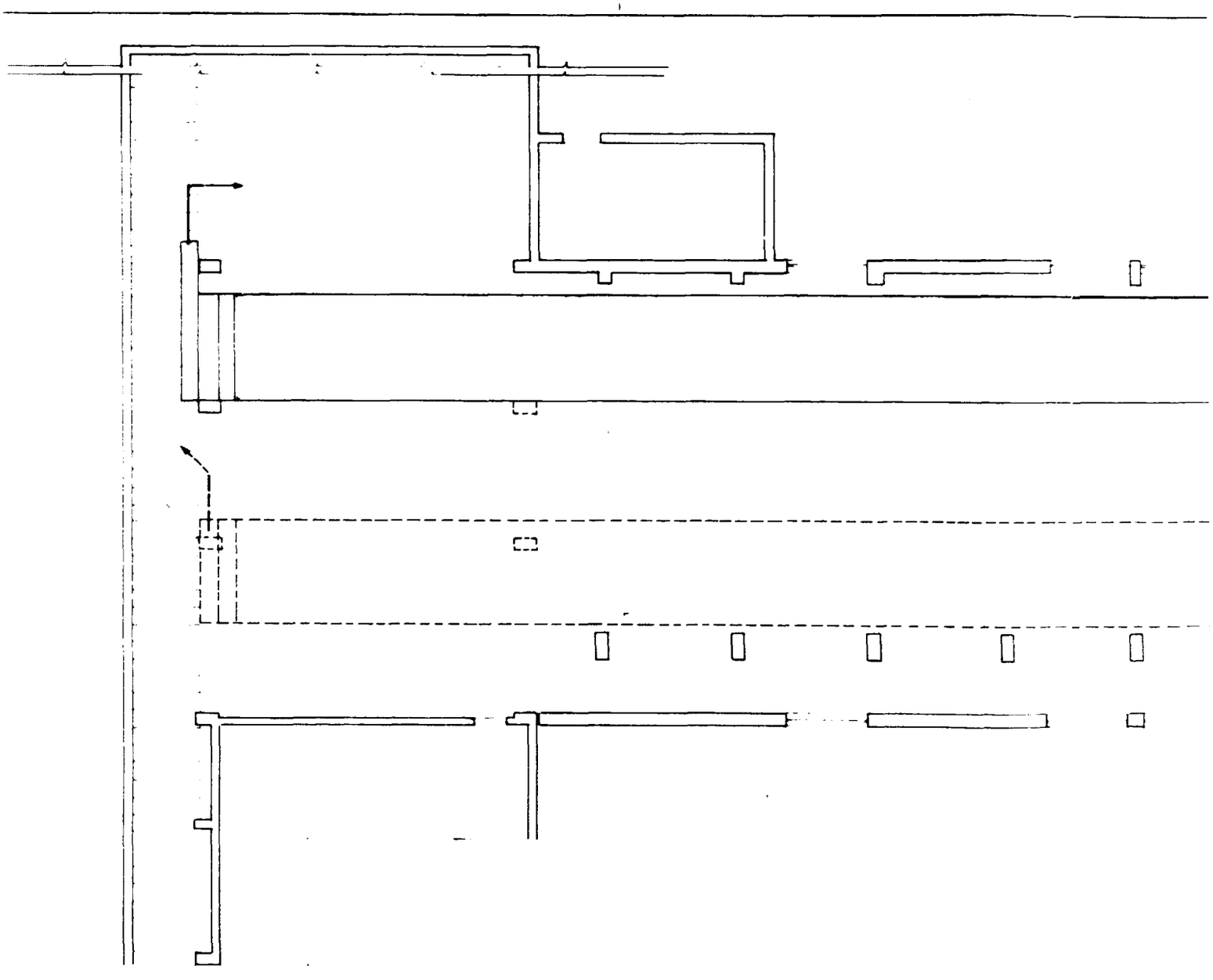

ANNEX V