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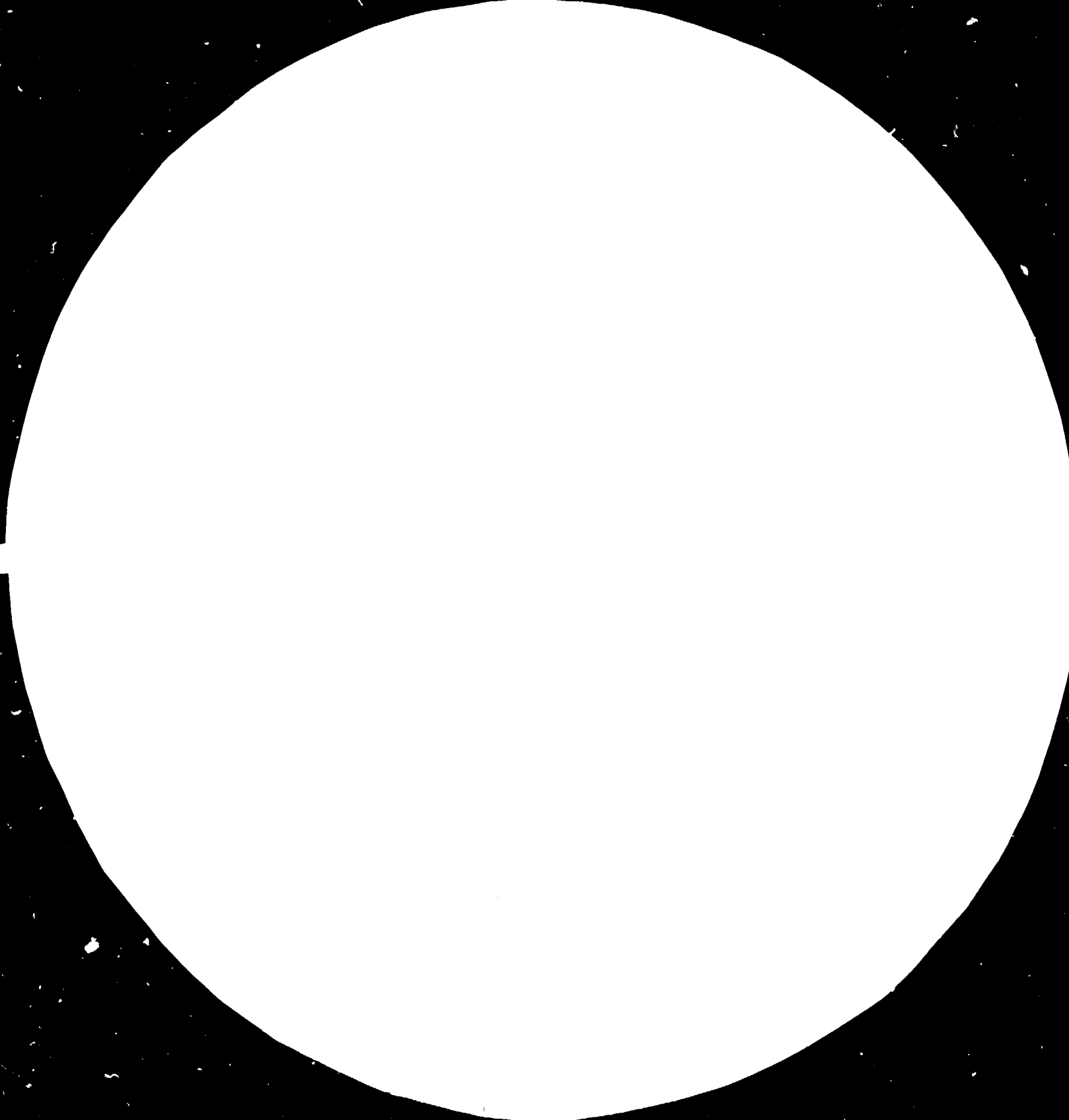
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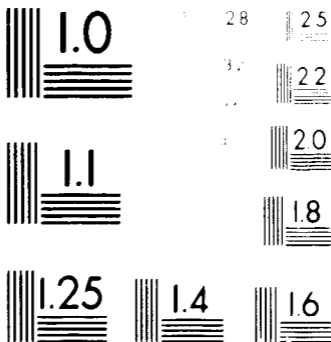
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MICROGRAPH RESOLUTION TEST CHART
 NATIONAL BUREAU OF STANDARDS-1963-A
 U.S. GOVERNMENT PRINTING OFFICE: 1963 O 454997

13842

Distr.
RESTRICTED

UNIDO/IO/R. 129
25 June 1984

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

ENGLISH / ARABIC

IMPROVEMENT OF THE OPERATIONS OF THE

ADEN FLOUR MILL

SI/PDY/83/802

Mission Report*

Based on the work of Dr. E. Gildemeister, UNIDO expert

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V.84-87829

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Summary

The wheat complies in every way with the demand of the production of high quality flour. The machines are properly maintained, however, qualified personnel are not enough to render special services. Therefore, it is hardly possible to operate the plant to the full extent as expected.

The main reason for the low quality of flour and poor performance of the mill is the extreme fluctuation of moisture content of the wheat from which the flour is made. The necessary equipment for obtaining an optimum moisture content is available, however, it cannot be used because of the low water pressure. This problem has been solved by using an additional water pump.

An equipped laboratory is available but cannot operate due to lack of qualified manpower.

The following main tasks has been undertaken:

- the elaboration of a programme for flour quality testing and a service programme;
- obtaining the optimum moisture content of wheat with the equipment available;
- setting-up a damping time plan;
- carrying out the service of the plan sifters;
- setting-up of a laboratory control plan, training of the laboratory assistant;
- adjustment of the roller millers;
- providing the management staff, millers and mechanics with experiences.

The following are required to guarantee the proper performance of the mill:

- qualified technical director;
- qualified mechanic for rendering special services;
- qualified laboratory assistant;
- employment of a specialist for the maintenance of the roller millers;
- labelling of the flour sacks in order to observe the storing time;
- providing the variety of wheat according to the chief miller's request.

General information

The flour mill consists of the following departments:

1. Silo (in-take and storage of wheat);
2. Cleaning department: the wheat delivered is cleaned on two lines working independently from each other to achieve the optimum point for the next milling process;
3. Milling department: the wheat is processed into flour or semolina and bran. Processing is done by two systems working independently from each other;
4. Mixing department: Flour and bran are mixed, stored and put into bags/sacks.

1. Assessment of the present situation

1.1 Intake/Silo

The wheat is delivered in sacks and after unloading from the lorries they are brought to the intake hopper, these are done manually causing unjustified labour input. Transporting the wheat within the factory and storing in silos are done in an unpacked, loose condition which corresponds with international standards.

1.2 Cleaning department

The imported wheat, partly bought from Australia, is previously treated. Before milling, it is cleaned by the cleaning machine available which operates properly. One of the washing machines is out of order due to technical reason (not repairable) and the second one would urgently need major overhaul. As a consequence to that, the water pressure is very low, and it is therefore, not possible to use the damping unit. Consequently, in one of the cleaning systems, the wheat cannot be moistened. Thus, the moisture of wheat in this systems amounts to 9 - 14 per cent only, depending on the variety of wheat. The optimum moisture required for milling is 16 per cent. Milling of wheat having a moisture content of 9 - 14 per cent at any time results in a considerable decrease of flour quality.

1.3. Milling department

The flour mill is in a clean condition and in accordance with the hygienic requirements of a foodstuff production plant. In the milling department, except for the purifiers, all machines are in operation.

The distribution of the flow of the grinding stock to the roller millers does not correspond to the project requirements. The main reason for the above situation is the following:

- too low moisture content;
- worn out rollers of the roller millers;
- broken sieves of the plan sifters.

The flow of the grinding stock (wheat) is generally lead to the breaks whereby the reduction and grinding section have an insufficient amount of loading. This situation and the too low moisture content of wheat are the main reasons for the very low output of the flour mill.

The automatic cleaning of the filters cannot be carried out properly due to mechanical deficiencies which is another reason for not being able to achieve the expected rate of delivery of the pneumatic transport system and therefore, the output of the flour mill per day decreases significantly.

Load of the roller millers before readjustment (moisture content - 15.1 % with a moisture content of 9 - 14 % the data calculated are even lower).

Section	Load (%)	Distance between rolls	Remarks
I break	95	too large	output of semolina too small
II break	95	too large	output of semolina too small
III break	70	too large	output of semolina too small
IV break	100	normal	grinding stock too coarse
V break	110	normal	flour portion at the skin too high
1. reduction	80	too large	---
2. reduction	10	too large	---
3. reduction	90	normal	skin portion too high
1. ground	40	not adjustable	no milling effect
2. ground	60	normal	almost no fluting on the rollers
3. ground	70	normal	--
4. ground	70	open	--
5. ground	80	normal	--
6. ground	40	open	--
7. ground	90	normal	--
8. ground	100	normal	--
9. ground	110	normal	--

1.4. Spare parts store

In this store everything is kept in good order. The spare parts are registered upon receipt and are distributed by a storekeeper. All spare parts are kept on shelves and looked after accordingly.

1.5 Work shop

Electrical work shop

It complies with the demand of the flour mill. The electricians keep the electrical device in good order and it corresponds to the national standards.

Mechanical work shop

The equipment is adequate for carrying out the necessary repairs. Special repairs are carried out in other factories as the above repair shop is not in a position to render special services such as the regulation of roller millers, automatic weighers for flour and wheat, repair of the filters, etc.

1.6 Mixing section and dispatch

Storage and sacking correspond to the international technical level. The manual input for transportation of the sacks is too high. An alternative solution of this problem is already envisaged.

1.7 Laboratory

The technical equipment for checking the milling process and testing the quality of wheat and flour is available and ready for operation. However, there is nobody available to carry out the laboratory tests. Thus, the operation of the laboratory is inefficient and it is not possible to control the milling process and quality of wheat and flour properly because of lack of measured values and evaluated data.

1.8 Electrical equipment

The low voltage switching station of the flour mill has neither an airconditioner nor a dust-proof cover. Especially in the hot period of the year, the electrical units often fail to function due to the high temperature. Accumulation of dust on and in the units causes the breaking down of the power supply which results in the inefficiency of the flour mill.

2. Evaluation of the situation

The main tasks to be undertaken are the following:

- analyse the wheat available and decide on the processing criteria;
- train laboratory workers to check the milling process and than control it;
- determine the necessary laboratory testing points within the milling process;
- increase the moisture content;
- setting up a plan of silo bin assignment in order to guarantee the damping times required for wheat to obtain the moisture content desired;
- modify the process flow chart according to the latest scientific development;
- modify the process diagram in order to produce high quality flour even without using purifiers;
- control of the plan sifters and replacement of discarded sieves;
- adjust the roller millers;
- provide the staff with the latest scientific development in the field of wheat processing and the results of wheat milling investigations in tropical countries;
- provide the millers, mechanics and electricians with the practical experience required for management and control of the wheat processing;
- investigation of storage and transport of grain and flour
 - flour storage
 - economic evaluation of bulk flour transport
 - loss of quality through inadequate storage
 - proposal for bulk flour transportation to the bakeries
 - trans-shipment of grain in harbour and transportation to the flour mill
 - evaluation of economy of the grain transport
 - proposal for bulk grain transport (bulk loading).

2.1 Analysis of the available wheat

During the period of investigation, February, March, April 1984, hard wheat and a mixture of hard and soft wheat were processed. All types of wheat processed corresponded to the demands made on wheat for producing high quality flour for nourishment purposes. The wheat examined was very clean, free of pests and grain deceases.

There are no reservations for the above wheat to be processed in flour mills to high-class flour for baking purposes. The moisture content of wheat, depending on the variety, amounts to 8 - 14 per cent (at the time of delivery). To achieve a constant high quality of wheat, it is necessary to process a constant mixture of hard and soft wheat.

2.2 Laboratory

The laboratory is equipped with a measuring equipment necessary for controlling the milling process. However, qualified manpower is lacking, consequently, the laboratory is ineffective for the necessary measurement for influencing the milling process. The most significant methods of laboratory test were discussed and the laboratory worker was given the necessary information. For the laboratory tests, a scheme was drawn up and staff were trained. (For Scheme see Enclosure 1).

2.3 Moisture content

The optimum moisture content for the milling process amounts to 16.0 - 16.5 per cent depending on the type of wheat. Because of insufficient water pressure, the dampers on the upper floor are not used. The processing moisture of wheat, therefore, amounts to 8 - 14 per cent only, i.e. the wheat processed is too dry. This results in the following disadvantages:

- decrease of baking ability (damage of starch granules)
- decrease of the output of the flour mill
- the flour becomes too dark (high content of skin)
- extensive wear of the plant especially of the roller millers
(break systems are overloaded, reduction and grounding underloaded).

In order to increase the moisture content of wheat, it is necessary to install an additional pump and pipe from the ground floor to the 5th floor and let the available dampers be given a major overhaul. This would help in achieving the necessary optimum wheat moisture (16 - 16.5 per cent).

2.4. Plan for filling the damping bins

Depending on the water added, it is necessary to keep the grain for a certain while to get moistened. Therefore, a plan for filling the damping bins was worked out and the reason and effect of it practically demonstrated to the millers (filling of damping bins see Enclosure 2).

2.5 Plan sifter

The purifiers are not working at present because they need a major overhaul. Due to that, the flour becomes darker and the productivity of the flour mill decreases. In order to avoid this, it is necessary to modify the plan sifter scheme and change the sieves of the plan sifters according to the latest scientific development and experience in running flour mills abroad (See milling diagram).

In all sections, the sieves of the plan sifters were periodically checked, the broken sieves were replaced and put in the plan sifter according to the new diagram.

2.6 Adjustment of roller millers

The sieves of the plan sifters have to be exchanged alternatively to adjust to the distance of the rollers. When adjusting the I, II and III break, the even distribution of grain to all the following roller millers is decided. The correct adjustment of the roller millers is, if the proper sieves of the plan sifters are chosen, one of the pre-condition for producing high quality flour.

A significant parameter for adjusting the roller millers is the degree of wear of the rollers of the 17 sections. Thus, the adjustment of the 20 pairs of rollers according to the moisture content of the wheat, wheat quality and condition of the rollers corresponding with the 324 sieves of the plan sifters having different mesh sizes decides upon the load of the 17 sections and therefore upon the flour quality and milling performance. The exchange of one of the sieves of the plan sifters or the alteration of the distance between the rollers of one of the 20 pairs of them can already result in an essential alteration of the flow of production and therefore, influence the quality of flour and milling performance to a great extent.

The diagram has, therefore, to be modified in gradual steps only in order to pursue exactly the results of modifications. In some cases, the full effect mentioned can be ascertained only after one hour.

2.7 Provision of experiences

In order to increase the effectiveness of the flour mill, special emphasis should be placed on providing the staff with the latest scientific and practical knowledge in the field of wheat processing and with the results of the research of wheat processing in tropical countries.

The practical experiences provided are aimed at:

- timely recognition of faults before it becomes necessary to interrupt the milling process;
- achievement of the desired moisture content of wheat;
- observation of the time required for wheat damping;
- adjustment of the roller millers in order to distribute the grinding stock properly according to the project. This has to be examined with the help of the pattern handed over.

2.8 Wheat input and dispatch

The wheat is delivered to the flour mill in sacks. The heavy physical work and high economic expenses cannot be justified any more by the high technical level reached at present. The flour is dispatched in sacks while there is already the preconditions for a bulk flour transport of 20 per cent of the daily production. The advantages of a bulk flour transport and loading of bulk wheat are described in detail in the Enclosure of this report.

3. Conclusions

3.1. Home trade has the following position

Flour is produced from wheat without considering the quality of wheat. The quality of flour and its baking ability are determined later. According to the results achieved in the laboratory tests, different varieties of flour are mixed. This process is very difficult and time as well as labour consuming. On international scale, the flour:

mixture is usually done in the flour mill according to the flour quality required. This is the simplest and most economical method. Experienced millers are in a position to evaluate the wheat quality by examining the flour.

It is necessary to provide the wheat from the Central Store (Home Trade) according to the quality of flour to be produced and the performance of the flour mill. Accordingly, it would be possible to produce high quality flour constantly.

3.2 Laboratory tests

For controlling the milling process and determining the final quality of flour, the following laboratory tests will be necessary:

- manufacturing (milling) process
 - determine the moisture content of wheat before cleaning;
 - determine the wheat quality before cleaning;
 - determine the moisture content before I break;
 - determine the moisture content of flour and bran after milling;
- final quality of flour
 - determine the moisture content;
 - ash determination or determine the brightness of flour;
 - determine the baking ability (by means of a farinograph);
 - determine the granular structure of flour.

3.3 Determination of moisture content

The production of high-quality flour is only possible with wheat having (besides other parameters) exactly obtained the required moisture content. A too low moisture content is, as already mentioned, the main reason for low quality of the flour produced in the Aden flour mill. To obtain the moisture content required, it has to be determined at the following departments of the production process:

- in-take hopper
- before cleaning)
- before I break) measure every 8 hours with a moisture content meter.

The above measures have to be carried out by the shift leader. The moisture content meter must be easy of access to the millers.

3.4 Roller millers

The adjustment of the roller millers has shown that a great part of the rolls urgently need fluting, for instance I, II and III break; 1st reduction, 2nd and 3rd ground. In case the rolls are dull, grain size, quality of the product and the sieves of the plan sifters do not correspond with each other. The last section is overloaded, the output becomes smaller and the productivity of the flour mill decreases. The necessary roll fluting machine and supplementary rolls are available. Accordingly, the preconditions of the rolls to be fluted are given.

3.5 Flour storage at home trade

The flour is put into sacks and intermediately stored in Home Trade warehouses. Thirty sacks are stacked on each other, and the storage time lasts up to one year or even more. It is not possible for the bakery to exactly determine how long the flour has been stored as there are no indication of the dates or any other mark on the sacks. Samples have shown that the flour which has been stored for a longer period of time and then processed in the bakery, has the following disadvantages:

- probably storage time of about one year
- considerable pest investment (beetles, moths)
- acidity of flour too high
- activity of amylases too small
- proteins are damaged (elasticity decreased by fifty per cent).

From the above situation one can see that the flour has been stored too long. Because of the high pest investment, it is no longer suitable for human consumption. Under the Aden conditions of flour production and the climatic conditions, it is necessary to observe a storing time of maximum four months. The supervision of the storing time has to be guaranteed by marking the sacks (labels) with the date of manufacture, and once a year, it is necessary to carry out pest control.

4. Conditions for observing the conclusions mentioned

The overall working time was divided into two sections, mainly:

1. qualification of manpower to maintain the improvement achieved;
2. providing the conditions for the improvement of flour quality and the output of the flour mill.

4.1. Further qualification

4.1.1. Technical director

In order to utilize and put in to practice the latest scientific experiences in the field of grain processing, it is necessary for the technical director to attend a course held in an appropriate scientific institution.

4.1.2. Service personnel for special machines

At present, the service of special machines (for instance controlling the roller millers, automatic grain and flour weighers, filters) is not guaranteed. Therefore, it is necessary for one mechanic to attend a three-month course at the manufacturer of the machines in question and to gain special experience in the practical use of these machines (not a general training).

4.1.3. Engineer for milling process

Because of lack of water, the grain washing machine needs to be replaced by the newly developed spray damping system. Experiences have shown that it is necessary to train the operating personnel accordingly. It is, therefore, recommended that a request be made for an expert who, after having installed the equipment, give instructions to the personnel within a period of two months, on how to use the spray damping process and operate the flour mill based on his own experience.

4.1.4. Specialist for roller millers

The manufacturer of roller millers should be requested to provide a specialist for the service and training of the mechanics (time of employment - 2 months). It is necessary to ascertain beforehand the availability of relevant spare parts.

4.2.4. Roller millers - degree of wear of the rolls

The rolls and the quality of the flutes must be checked once a month. As a result, a programme for replacing the roll has to be set up. Special emphasis has to be paid to the quality of flutes of I, II and III break because in these sections, the distribution of the flow of products and the productivity (output) of the mill is determined.

4.2.5. Automatic control of the roller millers

The roller millers functions automatically depending on the flow of grinding stock so as to avoid the rolls operating without wheat. Once a week, on the day of repair, the automatic control has to be checked for proper operation. If they operate properly, the working time of the flutes is increased and break-downs can be eliminated easily.

4.2.6. Labelling of the flour sacks

Judging from the quality of the flour, one would know that the flour has been stored too long. However, it is hardly possible to determine the exact storing time. Consequently, flour sacks have to be labelled (the date of putting the flour into the bags imprinted) or otherwise marked with the date in order to guarantee a continuous turn-over of the stock.

4.2.7. Airconditioning in the switch room

The switch room of the low voltage equipment must be closed to avoid dust and must be airconditioned in order that it does not become too hot due to electrical equipment. The installation of an airconditioner would be most advantageous, that way there is some excessive pressure in the low-voltage switch room and no dust can enter through the small openings.

5. Additional programme

Proposal for an increase in wheat and flour transport

5.1 Grain (wheat) transport

At present, the grain imported from abroad is transported in sacks only. This method results in the following additional expenses:

- filling the sacks with grain in the supplier's country;
- loading the ships by crane resulting in a longer lay time of the freighters and minimum use of their cargo hold;
- unloading the freighters by crane at the harbour;
- turn-over the freight to smaller cargo-boats;
- unloading the small cargo-boats;
- transport of wheat in sacks to the ware houses;
- stacking (up to 30 sacks one on top of each other);
- transport of sacks to the flour mill;
- unloading the lorries in the flour mill.

The transport of the sacks to the sections mentioned is very labour consuming especially under the tropical climatic conditions and results in a significant increase of prices of wheat. Therefore, the bulk wheat transport is proposed whereby cargo-boats are unloaded by means of pneumatic and mechanical handling devices. Furthermore, one should build an intermediate storage place at the harbour where the wheat are stored in silos or by other suitable method (halls, open area).

5.2. Flour transport

Putting the flour into the sacks and dispatching them are both extremely labour consuming and expensive, as the following steps have to be carried out:

- putting the flour into the sacks;
- closing the sacks (sewing up);
- transporting the sacks to the lorries and loading them;
- unloading the lorries at the intermediate store;
- loading the lorries in the intermediate store;
- unloading the lorries in the baking house/bakery;
- emptying of the flour sacks.

The above mentioned work is similar to the wheat transport, which is connected with heavy physical labour and results in high costs.

For the bulk flour despatch, the following investments will be necessary:

- 1 automatic flour weigher
- 1 unloading worm
- 1 lorry with pneumatic unloading facility (tank car).

In the new baking house of Moalla and Mansura precondition for the acceptance of bulk flour exists. The above two baking houses would be in a position to take over about 15 to 20 per cent of the flour produced in the Aden flour mill. A bulk flour transport complies with all sanitary requirements which is not the case when the flour is transported in sacks. The present report has exactly shown the advantages of the bulk flour transport and processing to be derived at for the national economy of the Peoples Democratic Republic of Yemen.

In order to obtain an exact description and calculation, it would be necessary to elaborate a study containing information on the exact advantages with regard to the economizing of labour and reducing the costs.

Enclosure 1 - Damping Time - Cleaning

day/time	1st system						2nd system						remarks						
	1st cond.			2nd cond.			3rd cond.			1st cond.				2nd cond.			3rd cond.		
	1st bin	2nd bin	3rd bin	1st bin	2nd bin	3rd bin	1st bin	2nd bin	3rd bin	1st bin	2nd bin	3rd bin		1st bin	2nd bin	3rd bin	1st bin	2nd bin	3rd bin
8.3.1984 7 a.m. 2 p.m. 9 p.m.	1/1	1/2↓	1/4↑	-	1/1↓	3/4↑	1/1	1/4↓											
9.3.1984 7 a.m. 2 p.m. 9 p.m.																			

Note: 1/1 - silo bin filled; 1/2 - silo bin half full; - silo bin empty;
 ↓ - silo bin is emptied; ↑ silo bin is filled.

Enclosure 2 - Determination of the moisture content - Laboratory

day/time	Moisture content silo	Moisture content I break		Moisture content flour	
		1st syst.	2nd syst.	1st syst.	2nd syst.
8 March 1984 7 a.m. 1 p.m.	11.5	15.9	16.3	13.5	14.0

Moisture
content
bran

Ash content

Remarks

1st 2nd
syst. syst.

14.1 13.9

Enclosure 3 - Control System for the flour mill at Aden (PDRY)

The main problems that are not solved in the Aden flour mill at present but have a direct influence on the production flow are mentioned below.

1. Delivery and storage of wheat

1.1. Provision of wheat

Hard and soft wheat must be available continuously in the silo of the flour mill. Only then it is possible to produce flour of good baking quality. The wheat has to be ordered from and delivered by Home Trade.

Respons.: Chief miller

1.2. Storage of wheat

The wheat has to be stored in the silo bins of the flour mill according to its quality (hard or soft wheat) and moisture content. The moisture content has to be determined.

Repons.: Silo master (storage)
laboratory (control of moisture content)

Time: daily or when changing the variety of wheat

2. Making up the wheat mixture

2.1. Making the wheat mixture according to the quality of the flour required, determine the silo bins the wheat is taken from.

Respons.: Chief miller

Time: daily

2.2. Determine the moisture content of wheat before cleaning by means of high-speed moisture meter.

Repons.: Miller

Time: three times a day

2.3. Determine the quality of water to be added at 1st, 2nd and 3rd damping; determine the time the wheat has to be kept before milling in order to obtain the moisture content desired (damping time) and of the bins.

1. storage of wheat for water absorption at least 8 hours;
2. storage of wheat for water absorption at least 8 hours;
3. storage of wheat for water absorption depending on the addition of water 0 up to 6 hours.

Respons.: Millers

Time: when changing the variety

- 2.4. Determine the moisture content before break I

Respons.: Laboratory

Time: every day at 8 a.m. and 1 p.m.

3. Milling

3.1. Laboratory tests

- a) Moisture content of flour and bran.

Respons.: Laboratory

Time: every day at 7 a.m. and 1 p.m.

- b) Ash content.

Respons.: Laboratory

Time: daily

- c) Granule structure of the flour.

Respons.: Laboratory

Time: daily

- d) Baking ability of the flour

Respons.: Laboratory

Time: daily

3.2. Supervision of the milling section

- a) Productivity of the flour mill (output)

Respons.: Chief miller

Time: daily

- b) Adjustment of the roller millers (visual test break V, semolina and flour must not be present)

Respons.: Chief miller

Time: daily

- c) Supervision of the adjustment of break I, II and III so that the stream/flow of the grinding stock is distributed according to the project.

Respons.: Millers

Time: twice a shift

- d) Supervision of the correct adjustment of the other roller millers
Respons.: Millers
Time: once a shift
- e) Supervision of break IV and V and 7th milling whether the necessary degree of milling (milling effect) has been reached.
Respons.: Millers
Time: three times a shift
- f) Supervision of the automatic cleaning of the filters especially at the time when the performance of pneumatic equipment decreases.
Respons.: Millers
Time: daily

4. Maintenance

- 4.1. Before operating the maintenance/repair shift the following units need to be checked.
 - a) Sieves of the plan sifters
Respons.: Chief miller
Time: once a week
 - b) Sieves of the purifier
Respons.: Millers
Time: once a week
 - c) Filters (small holes, automatic cleaning, etc.)
Respons.: Millers
Time: once a week
 - d) Electrical plant (motors, switch boards, etc.)
Respons.: Electrician
Time: once a week
 - e) Availability of the frames of the plan sifters for sections to be changed according to the diagram.
Respons.: Millers
Time.: before the day of repair
 - f) Bucket conveyors (belts and buckets), transport worms and other conveying equipment.
Respons.: Millers
Time: once a week

4.2. Implementation of the maintenance/repair shift.

- a) Control of the sieves according to the instruction of the chief miller.

Respons.: Millers

Time: day of repair

- b) Repair of electrical plant foreseen the day before.

Respons.: Electrician

Time: day of repair

- c) Cleaning and control of the filters.

Respons.: Millers

Time: day of repair

- d) Current mechanical repair according to the instructions of the Chief Miller.

Respons.: Mechanics

Time: day of repair

- e) Control of the roller millers and elaboration of a roll exchange plan.

Respons.: Chief of miller

Time: day of repair

- f) Cleaning and control of the laboratory equipment.

Respons.: Laboratory

Time: day of repair

- g) Control of the motorvee belts (in view of wear, rigging).

(The vee belts are to be replaced only in case they are broken.

In most cases it is sufficient to rig them by adjusting the motor).

Respons.: Mechanics

Time: day of repair

- h) Lubricating according to the lubrication plan.

Respons.: Millers/mechanics

Time: day of repair

نظام المراقبة لمطحنة عدن في جمهورية اليمن الديمقراطية

سنذكر هنا المشاكل التي تعترض العمل في مطحنة عدن ، دون التطرق الى بقية العمل الذي لا تعترضه مشاكل أو لا يؤثر على عملية الانتاج .

١ - تأمين الأقماع الى المطحنة

١ - ١ تأمين الأقماع

يجب أن تتوفر في سيلوات التخزين في المطحنة كميات الأقماع الكافية بأنواعها القاسية والطرية وذلك لضمان انتاج الدقيق ذو المواصفات الغنية الجيدة والذي يعطي بالتالي خبز ذو مواصفات فنية جيدة باستمرار .
وتطلب الأقماع اللازمة للمطحنة من حيث النوعية والصف حسب حاجة المطحنة من مكتب الحبوب (التجارة الداخلية) وذلك لضمان تطبيق خلط الأقماع المناسبة . وان المسؤول عن تنفيذ ذلك معلم المطحن .

٢ - ١ تخزين الأقماع في سيلوات التخزين

يجب تخزين الأقماع الواردة الى المطحنة حسب نوعيتها قاسية أم طرية وحسب نسبة الرطوبة في خلايا السيلو المختلفة بصورة منفصلة عن بعضها ، مع مراقبة نسبة الرطوبة لهذه الأقماع المخزنة في الخلايا .
والمسؤول عن عملية تخزين الأقماع :

- ١ - معلم السيلو (معلم التنظيف والصويل) .
- ٢ - مختبر التحليل لتحديد نسبة الرطوبة .

وتتم عملية مراقبة الحبوب في خلايا السيلوات يوميا ، وعند وصول الشحنات الجديدة منها .

٢ - تطبيق خلطة الأقماع المناسبة للانتاج

١ - ٢ يجب تطبيق خلطة الأقماع المناسبة للطن بالنسبة المثوية المحددة ، وذلك بالاستناد الى نوعية ومواصفات الدقيق المطلوب للصناعات الغذائية المختلفة ، مع تحديد الخلايا التي سيسحب منها القمح .

- ان المسؤول عن تنفيذ تطبيق الخلطة معلم الطحن .
- يجري تطبيق الخلطة بنسبها المثوية المطلوبة يوميا .

٢ - ٢ تحديد نسبة الرطوبة المثوية للقمح قبل عملية التنظيف بواسطة جهاز تحديد الرطوبة الكهربائي .

- والمسؤول عن تنفيذ ذلك الطحان في الوردية .
- وتتم عملية مراقبة نسبة الرطوبة ثلاث مرات يوميا .

٣-٢ تحديد نسبة الرطوبة المثوية التي يجب اعطاؤها للقمح بواسطة أجهزة الترطيب الأولى والثانية والثالثة ، مع تحديد فترة تخمير القمح أو تكييفه (بمساء القمح المرطب في خلايا التكييف لفترة معينة) وذلك بالاستناد لنوعية القمح قاسي أم طري :

- ١ - عملية التخمير الأولية ٨ ساعات على الأقل .
- ٢ - عملية التخمير الثانية ٨ ساعات .
- ٣ - عملية التخمير في الخلايا الأخيرة من : ٦ ساعات وذلك حسب نوعية القمح وحاجة المطحنة .
- المسؤول عن عملية التنفيذ الطحان في الوردية .
- يحدد الزمن المناسب للتخمير عند تبديل الأصناف المعاملة .

٤-٢ تحديد نسبة الرطوبة في القمح قبل الجرش الأول " الكسرة الأولى "

- المسؤول عن التحديد والمراقبة مختبر التحليل .
- عملية المراقبة تتم الساعة الثامنة والساعة الثالثة عشرة .

٣ - عملية الطحن

١-٣ المراقبة المختبرية

أ - تحديد نسبة الرطوبة المثوية للدقيق الناتج وكذلك النخالة Bran

- المسؤول عن تنفيذ ذلك مختبر التحليل .
- المراقبة تجري الساعة السابعة والثالثة عشرة .

ب - تحديد نسبة الرماد المثوية للدقيق الناتج

- المسؤول عن تنفيذ ذلك مختبر التحليل .
- تجري المراقبة مرة واحدة يوميا .

ج - مراقبة تحبب الدقيق الناتج

- تتم عملية تحديد التحبب للدقيق من قبل مختبر التحليل .
- المراقبة تتم يوميا .

د - تحديد المواصفات للنوعية للدقيق وقابليته لانتاج الخبر الجيد ، بواسطة

جهاز الفارينوغراف "قوة العجين"

- المسؤول عن تنفيذ المراقبة مختبر التحليل .
- تتم المراقبة يوميا .

٢-٣ الرقابة على قسم الطحن

- أ - مراقبة الطاقة الانتاجية للمطحنة
- المسؤول عن المراقبة والتنفيذ معلم الطحن .
- تتم المراقبة العملية للطاقة الانتاجية المقررة يوميا .

و - من اقية شغط الحقيق من الغلغس بانتظام (وبمورة خاصة عند انخفاض استطاعة نظام البنديماتيك)

- المسؤول الطحان في الوردية .
- المراقبة يومية .

4- وردية الميانة الدورية

1-4 قبل اجراء الميانة الدولية يجب من اقية التالي :

- 4-1-1 من اقية ممرات النخل "البيلانجسترات" فيما اذا كان فيها متازل متقوية او متعطله
- المسؤول : معلم الطحن.
- التنفيذ اسبوعيا .

- 4-1-2 من اقية آلات تنقية السميد فيما اذا كانت منازلها صالحة وغير منقبة .
- المسؤول : الطحان .
- التنفيذ اسبوعيا .

- 4-1-3 من اقية وضبط الغلاتر (اذا كانت منقبة ، وعملها الميكانيكي جيد بالنسبة للنقط)
- المسؤول عن التنفيذ الطحان .
- مرة في الاسبوع .

- 4-1-4 من اقية الاجيرة الكهربائية (المحركات ، لوحات التشغيل ، الخ)
- المسؤول : كهربائي الوردية .
- مرة في الاسبوع .

ب - مراقبة تعيين سلطات الطحن

(وذلك بملادة مضمون الجرش الخامس ، أي أن يكون خالي من السميد والدقيق)

- المسؤول معلم الطحن .

- والمراقبة تتم يوميا .

ج - مراقبة تعيين سلطات الطحن للجرش الأول والثاني والثالث أي اسطوانات

الطحن ، وتوزيع المجروش المطحون حسب مخطط الطحن المقرر (جرش - سميد -

تخفيف)

- المسؤول عن التشغيل طحان الوردية .

- العملية تجري مرتين خلال الوردية الواحدة .

د - مراقبة عيار بقية سلندرات الطحن

- المسؤول الطحان في الوردية .

- تتم المراقبة للعيار والضغط مرة واحدة في الوردية .

ه - مراقبة الجرش الرابع والخامس ومسر الطحن السابع فيما إذا كانت نسبة

استخراج الدقيق فيها صحيحة .

- المسؤول عن ذلك الطحان في الوردية .

- تتخذ المراقبة ثلاث مرات يوميا في الوردية .

- ٥-١-٤ التحضير المسبق لاطارات النخل المختلفة وبالفترات المختلفة كاحتياط ، يتم تركيبها عند حدوث أي عطب في المناخل(والبلانجسترات العاملة) ، وحسب مخطط النخل .
- المسؤول : الطحان .
- قبل اجراء يوم التطييح أو الصيانة .
- ٦-١-٤ مراقبة الروافع العامودية الالفاتور = وخاصة القشاط ، وتشبيت العلب عليه بصورة محكمة . وكذلك مراقبة الجلزونات الناقله والنواقل المختلفة الأخرى.
- المسؤول : الطحان .
- التنفيذ : مرة في الأسبوع .
- ٢-٤ تنفيذ الصيانة الدورية
- ١-٢-٤ مراقبة شد اطارات النخل = نسيج المناخل - حسب توجيهات معلم الطحن
- المسؤول : الطحان .
- التنفيذ خلال يوم الصيانة والتطييح .
- ٢-٢-٤ تنظيف ومراقبة الفلاتر .
- المسؤول : الطحان .
- : خلال يوم الصيانة والتطييح .
- ٣-٢-٤ تصليح الأجهزة الكريائية بالاعتماد على تحديد العطل في يوم سابق للاصلاح .
- المسؤول : الكهربائي .
- التنفيذ خلال يوم الصيانة والتطييح .
- ٤-٢-٤ تنفيذ الاصلاحات الميكانيكية الجارية ، والاصلاحات الأخرى حسب توجيهات معلم الطحن.
- المسؤول عن التنفيذ الميكانيكي .
- التنفيذ يتم في يوم الصيانة والتطييح .
- ٥-٢-٤ مراقبة سلندرات الطحن جميعها وتحديد الاسطوانات التي يجب تبديلها بالاستناد الى برنامج الصيانة والتبديل .
- المسؤول : معلم الطحن والميكانيكي
- : التنفيذ يتم في يوم الصيانة والتطييح
- ٦-٢-٤ تنظيف ومراقبة أو ضبط آلات مختبر التحليل المختلفة .
- المسؤول : عناصر مختبر التحليل .
- مرة في الأسبوع .
- ٧-٢-٤ مراقبة قشط ف لجميع محركات قسم الطحن فيما يخص درجة التآكل ودرجة شدها .
- وتبديل القشط الفاسدة أو المتآكلة فقط حيث في العادة يتم شد قشط ف للمحركات بسحب المحركات على سكاكها (قواعدها) لزيادة توتر هذه القشط .
- المسؤول : الميكانيكي
- التنفيذ خلال يوم الصيانة والتطييح .
- ٨-٢-٤ التشحيم حسب خطة التشحيم المقررة لآلات المطحنة .
- المسؤول : الطحان
- الميكانيكي
- التنفيذ يوم الصيانة والتطييح .

