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HUNGARY

FINAL REPORT

On Repair and Maintenance of Industrial Equipment in Algerian People's Democratic Republic

UNIDO Purchase Order No. SSS 69/821. 704 p.

2651

BUDAPEST, 1969.

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BUDAPEST, 1969.

Abstract

This Report deals on one hand with the characteristic features of repair and maintenance of industrial equipment and agricultural machines in the Algerian People's Democratic Republic, on the other hand concludes with proposals to improve the level and standard of their activities. The statements and conclusions of the Report are based on the direct experiences and observations of a team of two experts visiting about 30 different factories and shops and a lot of official organs all over Algeria in a period of one month.

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2 Introduction

The United Nations Industrial Development Organization (UNIDO) provides to carry through a long-scale campaign in the frame of the industrialization program of developing countries with the object to improve the maintenance of industrial equipment and the repair service.

For the arrangement of the local survey in Algeria and the compilation of the report to be elaborated on the basis of this survey and containing the estimation of the survey as well as proposals concerning the assistance the UNIDO concluded a contract with TESCO Consulting Engineering (Contract No. 69/2, Req. No. SIS 69/521, Date 6 February 1969). The field staff (team) delegated on the basis of this contract, the members of which were Metallurgical Engineer and Team Leader András PINTÉR and Mechanical Engineer Béla SELYEBY conducted the survey as reported in the following.

On February 6th, 1969 the Team arrived in Vienna, where it had been discussed detail questions in connection with the jumey to Algeria with Mr. Mario Micilband obtained instructions concerning the task to be fulfilled from Mr.Dir. Quijano Caballero and Dr. Otto v. Soskuty.

After the stay in Paris where the Team obtained the Algerian visas, it arrived in Algiers on February 12th 1969. On the same day the members of the Team paid an introduction visit to the UN Resident Representative Mr. S. Andersen. In the course of this visit and in the following discussion in which Assistent Mr. A. Titov

as well as experts Mr. Noel and Mr. Komarowski took part. the delegation obtained valuable information about the economic life and within this the situation of the industry and agriculture.

On February 13th and 14th the members of the Team paid a visit of introduction and information to the directeur général de l'industrie M. M.Castel in the Ministere de l'Industrie et de l'Energie and to the directeur de la planification et de l'étude M. N.Boukli in the Ministere de l'Agriculture et de la Réforme agraire. In the course of the discussions that took place on this occasion the soudirecteur of the Société National des Compagnies Mécaniques M. Merad and the directeur de l'approvisionnement M. Abdeltif were named as liaisons and entrusted with the organization of the necessary program in the field of the industry and the agriculture, respectively.

In the period between February 17th and 24th the members of the Team had conversations in the two ministries with the officials of the directions of the various branches as well as with the officials of the directions of the societies acting under the supervision of the branch directions. The heads of the directions gave information with the assistance of specialists about the situation in the fields being under their supervision and quoted the data being at their disposal. They also named the most important factories and units from which the members of the team selected in the discussions with the liaisons the factories that could be considered as representative for the survey owing to their capacity or importance.

In the period between February 25th and March 8th the

Team visited the industrial and agricultural factories in Algiers and in other towns and places of the country that were selected according the preceding and got acquaintance on the site with the situation of maintenance, repair and spare parts supply.

During their work the members of the Team were in constant communication with the UN Resident Representative Mr. S. Andersen and the Assistant Mr. A. Titov, who were regularly informed about the process of the work and consulted in connection with the experiences gained and the data obtained. Also the Adviser of the Vienna centre of the UNIDO Mr. M. Fawzi who stayed in Algeria in the meantime was informed about the work of the Team.

After the local survey work was accomplished the members of the Team visited the UN Resident Representative Mr. S. Andersen on March 10th and gave him a detailed account about their work. On March 11th the Team returned to Budapest.

The estimation of the situation is based according to the preceding on three sources:

a/ on the information and the written or told data obtained in the ministries, societies and factories

b/ on the observations made and the experiences collected in the factories,

c/ on the information obtained from the local organs of the UN in the frame of consultations.

The activities connected with the sources quoted under a/ and b/ are listed in Table 1 (62.01 in 6.Appendix).

It has to be mentioned already now that the survey could not be extended upon the most important branch of industry, namely upon the oil production, transport and refining because it was not possible to obtain other than general information.

It has to be pointed out that the members of the Team were prepared to perform the inspections with the most up-to-date mathematical-statistical methods and operation research processes. As a contrary to this the data obtained for the inspected sectors concerned generally the years 1965 and 1966 and in addition there were fairly incomplete and in many cases different or even contradictory. Consequently the members of the Team were compelled to use largely the experiences collected on the site, that were, in spite of a certain subjectivity of great value when the situation of maintenance was summarily estimated, the conclusions drawn and the proposals worked out with the necessary practice and by the revaluation of the data obtained.

3 Preliminary Section

The inspections, the estimations and the proposals can be summed up as follows.

In the economic life of the country, it is even at present the raw material production (oil production and ore mining) and the agriculture as well as the foodstuff industry processing the products of this latter that have the dominant role. The metallurgical and the mechanical industry representing the basis for other industries may be neglected, there are no plans to develop them in the next future.

In the industry the level of maintenance is low and not satisfactory as a consequence of the low capacity of the industrial units and the heterogeneity of the machinery. 80 to 90 percent of the spare parts is imported from abroad, since no industry to make them is available. In the effort to reduce the volume of spare parts purchased from abroad most branches wish to establish their own and the mechanical industry whises to establish a central factory producing spare parts for all branches.

In the agriculture the capacity of the relatively well equipped central repairing factories, that are also capable of producing a certain quantity of spare parts, is not utilized and instead of this it is a tendency of developing the low-level district repairing shops that are not equipped sufficiently and are in lack of specialised workers.

On the basis of the estimation of the situation the proposals can be summed up briefly as follows:

At the first step the demand for maintenance and spare parts is to be estimated in each branch of the industry and the satisfaction of the same is to be controled centrally. At the second step should be made the development of the local maintenance shops and foundation of central spare parts storing. Later on the central spare parts producing factory will have to be replaced by mechanical factories that are also capable to produce spare parts.

In the agriculture it is necessary to ensure by way of organization a better utilization of the capacity of the existing central repairing factories and in the district repairing shops working under the supervision of the central plants only machine maintenance and minor repairs are carried out. Any decentralization of machine repairing may only be convenient at a later time.

Simultaneously and even before the maintenance service is organized and developed, respectively, and the recommended plants are established the training of specialists must be increased partly by inviting foreign instructors, partly by having people trained in foreign companies and institutions of education.

Both in the industry and in the agriculture the proposed estimation and organization work has to be carried out by co-operators delegated from abroad and for the establishment of the plants the material assistance of the UNIDO and the developed countries is necessary.

4 Detailed evaluation and proposals

41 Description of the general and maintenance situation in the industry

41.1 Organization and principal general characteristics

All branches of the industry, including the mining industry are subordinated to one state authority of supervision and control, the Ministry of Industry and Energy. The size of the different branches of the industry can be characterized, because of the extraordinary heterogeneity and small quantity of the products most conveniently by the number of the employees (workers + leaders). Division of the ministry according to branches of industry (UNDP data):

Denomination	Number of employees
1. Metallurgical and mechanical industry	11 200
2. Food industry	14 900
3. Chemical, textile and leather industry	17 100
4. Building material industry and miscellaneous	15 000
5. Energy supply	4 500
6. Mining industry	6 000
7. Hydrocarbure and heavy oil industry	8 600
Total	77 300
Other branches of industry (data obtained from the statistical direction):	
Building trade and communal works	10 200
Artisans	76 900
Total (employees in the industry)	164 400

As for the number of the employees in the mining and manufacturing industry the statistical direction and the ministry and their societies of this latter quoted deviating data. The deviations involve however no change in the order of magnitude of the ratios.

The artisans have no central control authority, they are not subordinated to the Ministry of Industry and Energy. The above data only include the permanent employees, i.e. they do not include season workers as encountered e.g. in the tinned food industry.

The data also show the unimportant role that the industry plays in the economic life. The portion represented by the workers employed in the mining and manufacturing industry is as little as 3.4 percent of the total number of omployees and the portion represented by the industrial workers including the artisans is only 8 percent of the total number of employees.

70 % of the total industry (except artisans) is nationalized.

As concerns the industry there were no significant changes in the 1965–66 period.

The present period of planning extends from 1966 to 1973 and this also means the beginning of the state's planned economy.

Estimate of investment for the plan period of 7 years (UNDP data):

Metallurgical industry	2 000 mDA
Mechanical industry	580 mDA
Hydrocarbure and heavy oil industry	8 500 mDA
Energy supply	700 mDA
Other industrial investment	2 130 mDA
T o t a l	13 910 mDA

Of the estimate of investment the share of the state-owned sector is as much as 13 700 mDA.

The number of the industrial employees (including the artisans) planned for 1973 is 250 000.

Most branches of industry do not play an important role in the economic life of the country. The only exception are the following branches:

Hydrocarbure and heavy oil industry
Food industry
Mining industry

An important portion of the crude oil products, representing the main source of income for the state is exported. The food industry produces mainly meal and farinaceous products as well as tinned vegetable and fruit to be exported. These form partly a countervalue of the imported food-stuffs. The mining industry employees a considerable portion of the industrial workers living in the country and large quantities of the iron ore are exported. The ratio of the export to the import and the principal factors are shown in Table 2 (62.02 in 6. Appendix). It is characteristic for the industry that the basic industry i.e. the metallurgical and the mechanical industry are extraordinarily undeveloped (total number of employees: 11 000). As a consequence of this the other relatively more deve-

loped branches of industry (food industry, etc.) use imported machines and equipment. The machines and the equipment were supplied by the developed countries in Western Europe. Recently machines were imported also from the Soviet Union and Yugoslavia.

The average age of the machines and equipment may be estimated 15 to 20 years so that the majority of them is amortized. It has to be noted, however, that in the field of the food, building material and textile industry there are also new factories and in some factories there are new machines and equipment. The modernization of some factories belonging to these branches of industry has been started with already earlier.

A summarizing characterization of industry is given in Table 3 (62.03 in 6. Appendix).

41.2 Situation and estimation of maintenance in the mining and manufacturing industry

The situation of maintenance in the surveyed sections and factories of the mining and manufacturing industry is described in detail in the enclosed reports (61.01-32 in 6. Appendix) and the results are summed up in Table 4 (62.04 in 6. Appendix).

41.21 Existing Repair and Maintenance Physical Facilities

42.211 Survey of existing repair and maintenance facilities

As a result of the circumstance that in the country there is no basic industry and that the other branches of industry use imported machines of various makes and models of which a considerable portion is outdated, maintenance and repair encounter difficulties in many cases and the operation of the machines is dependent upon spare parts supply from abroad.

The maintenance and repair organizations of the various plants show great differences. In the factories that are well or relatively well organized and work continuously turning out mass products or large series goods, such as some units of the food and building material industry, or the Ouenza iron ore mine, the maintenance and repairing shops are well equipped and perform efficient work. They have a well trained personnel and are led by responsible engineers. In these factories an almost systematic maintenance is performed mostly under the guidance of a foreign co-operator. In several places even the systematic preventive maintenance is being organized and the repair workshops are also capable of carrying out the general overhaul of the machines that is in many cases actually made in these workshops. In minor factories and in factories with poor organization as in several factories of the mechanical industry because of equipment and the number and level of the personnel the maintenance and repair service are unsatisfactory. These shops are guided by a foreman or a master. Maintenance and repair activity is unsystematic and its quality lags behind the required level.

41.212 Survey of centralized repair shops

For the nationalized factories unified in societies central repairing shops were organized in several section or the foundation of such central shops is planned. One of these central shops is the wagon repairing factory of Annaba in which, though under rather out-of-date circumstances, all ore-transporting wagons are repaired. There are also the central repairing shops in some sections of the food industry in which only the repair of some main units and in addition the production and storage of spare parts are carried out. The maintenance sections of the various factories are guided also by these shops.

41.213 Availability of spare parts

The majority of the spare parts (80 to 90 percent) is imported from abroad. In this field two difficulties present themselves. One of these difficulties is that the imports i.e. the necessary foreign currency is garanted by the ministry of finances. This is, in itself, a correct measure justified by the financial situation in the country but it causes a certain delay in the delivery of the parts. This circumstance partly explains why the stock of some factories seems to be in many cases too large and ties up considerable material means unnecessarily. The other difficulty results from the use of old outdated machines the production of which was discontinued long ago and the makers are not possible to supply spare parts.

41.214 Availability of spare parts manufacturing facilities

In the country the spare parts are produced partly by the factories' own maintenance and repairing shops, partly by various factories of the mechanical industry. The available capacity is, however, not fully utilized because of differences in the quality.

41.215 Availability of organized stores

The spare parts are stored in the factories or in some cases in the central stores of the societies. The necessary stock is established mostly by experience and in some cases by the supervision of the machines and on the basis of stock standards. Generally the stock seems to be oversized, that may be motivated by the difficulties encountered in the purchase of the spare parts. The registration of the stock is in most places clear, systematic and easy to survey. The actual situation is described in details the enclosed reports (61.01-32 in 6. Appendix) the level of storing in the several factories is estimated in Table 4. (62.04 in 6. Appendix).

41.22 Prevailing Conditions of Repair and Maintenance Activities and Diagnosis

41.221 Adequacy of present repair and maintenance facilities

The level of repair and maintenance work (see in Table 4. 62.04 in 6. Appendix) can be estimated in three grades. It can be stated, that the level is satisfactory approximatively in 30 % of the surveyed factories so in the most part of them the work is unsatisfactory. The low level of maintenance shows the relatively high idle time, however it was not possible to get exact data of their measure, due to the later described causes. The before mentioned low level can be partly the cause, that the factories prefer generally the import instead of home-made mechanical products including also the spare parts. It seems that the capacity of these factories, which are capable to produce spare parts (e.g. SN Métal Unité Cote Rouge, or Societé Nouvelle des Atelier et Fonderies C. Ducros, see 61.05 and 61.09 in 6. Appendix), is therefore utilized below 50 percent.

Although it seems to be a contradiction, the insufficiency of maintenance, repair and spare parts supply does not cause generally difficulties in production. The producing capacity of the majority of the factories is not fully utilized in the lack of orders and trained workers (in some cases utilization is below 50 percent) so that if one of the machines get defect production can be continuled with one of the machines being out of use. If the capacity were fully utilized the insufficiency of maintenance and difficulties in spare parts supply would result to stoppages in a great number of cases, the volume of this latter can, however, not be estimated on the basis of the survey of the present situation.

41.222 Industries in which the problem of repair and maintenance is acut

Insufficiency of repair and maintenance has it's importance at first in the mechanical industry, although by the existing level of production and quality requirements practically there are no particular problems, however in case of requirement for fully capacity utilization it must be reckonned with a lot of idle time. On the other hand the home machine production can only be competitive, if it's of high quality. But the preliminary condition for this is a well organized repair and maintenance on a high technical level.

41.223 Factors affecting the adequacy of maintenance and repair facilities

The circumstance that the great majority of the plants has a very small capacity involves diffuculties for maintenance, repair and spare parts supply. The fact that the industry, that cannot be considered as having great importance anyway, is disunited, hampers the reasonable unification of machinery, the central guidance or centralization of maintenance, repair and spare parts supply. In this field even the unifying of the nationalized factories in some sections of industry did not result in a marked change, since although approximately 70 percent of the industry is state owned, as regards the fixed funds, in the mechanical and electric machine industry, as well as in the chemical, textile and leather industry only 20 to 40 percent of the factories was nationalized and even nationalization could not always accompanied by the concentration of production and the organization of larger producing capacities. The covering of the great variety of machines used in the many small factories by a uniform system of maintenance, repair and spare parts supply seems to be an almost unsolvable task.

Further difficulties result of the inadequacy of equipment in repair and maintenance shops and their locating conditions. In this relation it must be stated, that satisfactory equipment was only in about 30 percent of the surveyed factories (details see in Table 4. under 62.04 in 6. Appendix).

Due to the described conditions the personnel's level is of great importance. Just in unsufficiently organized and equipped, factories the personnel's level is inadequate.

In general the investigated factors are about on the same level in a certain factory. But under the existing difficult objective conditions the personnel's level is of increased importance, therefore this question should occupy the first place from all factors affecting the adequacy of maintenance and repair.

At the same time it is to be pointed out, that both at the present production level and in case of a full utilization of the capacity with outside influences (humidity, temperature differences, dust, etc.) representing an increased source of wear for the machines as well as increased maintenance requirements resulting from these influences need not be recorded with. In the surveyed fields since the operating conditions are similar to those prevailing in the countries of Southern Europe. An increased wear and maintenance demand may be encountered in the oil fields and mines located in the Sahara, but these could not be surveyed by the team.

41.224 Effect of absence of standardization and unnecessary variety of equipment on maintenance and repair

Due to the heterogeneity of machinery there is actually no possibility for standardization. Due to foregoings and to the fact that in the great variety of existing machines there are relatively many outdated ones, a lot of difficulties in maintenance and repair work is caused.

41.225 Government organizations or private institutions dealing with repair and maintenance

Between government organizations only a few societies deal actually with effectively organized central control of maintenance and repair, e.g. the society of tobacco and match making industry or that of sugar industry. When societies, directions and even the ministry are starting with this work practically only now. In the private industry there are small and independent factories who have no own central organization and therefore repair and maintenance cannot be centrally controlled.

41.226 Government policy affecting repair and maintenance

As to the improvement of maintenance, repair and spare parts supply there are two opposing tendencies in the industry.

In the branches and societies in which these activities are more or less organized already at present, the best way of improvement is considered to be the centralization or the further development of available centres. The maintenance sections of the factories are wanted to work under central supervision. In addition it is planned to found a base for the production of spare parts, to centralize the purchasing and storing of the spare parts and possibly to establish a central repairing shop. This

trend can be observed mainly in the food, building material as well as chemical, textile and leather industries. The other tendency is to establish a central shop for manufacturing spare and wearing parts within the mechanical and electric machine industry, in the frame of the mechanical society SONACOM. This factory would supply also spare parts for other branches of industry and would capable to make overhauls. The plan study concerning the establishment of the factory is being elaborated and negotiations are in an advanced stage.

Neither of the modes of increasing the spare parts producing capacity may be considered as correct. As a consequence of the great variety of the machines used by the industry and of the small lot sizes resulting from this the production could be realized in the branches' own shops only by handicraft methods and even the central factory of the mechanical industry could not use up-to-date technology. Under such conditions the satisfactory quality of the products is highly questionable but economical production seems to be almost impossible.

The improvement of maintenance is indirectly assisted by the planned reconstruction and modernization of one part of the industrial establishments. The Team was given an opportunity to see the reconstruction of a few factories in progress. In the frame of the reconstruction the outdated machinery will be replaced by new machines that will show a certain degree of uniformization. It is also planned to shut down a number of out-of-date and uneconomical plants, primarily in the mining and mechanical industry. This would promote the concentration of production by the development of the remaining capacity and the establishment of new capacity.

42 Description of the situation of the machines used in agriculture

42.1 Organization and principal general characteristics

The agriculture is almost entirely under the control of the state or of the co-operatives, this latter form being in principle identical with the former one. The system is self directing of workers.

The number of people employed in the agriculture is approximately 1 200 000, hence agriculture is the most important economic factor of the country. The production volume is considerably smaller than in the period before 1965. (The Team was not given the task to trace the causes of this set-back but the principal cause seems to be the lack of organization.) The export of meat, farinaceous products, wine, alcoholic drinks, vegetables and fruits is considerable. On the other hand other basic food-stuffs (e.g. sugar, meat) is to be imported.

The agriculture of the country is moderately mechanized in the 200 km coastal zone, in the inner zone between Algiers and Oran and in the surroundings of Annaba visited by the Team. In many places there are irrigation systems. In the Annaba area even the winelands are cultivated with the help of various tractor-hauled implements. The soil and climatic conditions are satisfactory.

The agriculture has approximately 20 000 various tractors and prime movers as well as approximately 2 000 important farming machines of various kinds (harvesters, harvesting-threshing machines, etc.)

The data characteristic for the mechanization of agriculture are indicated in Table 5 (62.05 in 6. Appendix).

42.2 Situation and estimation of maintenance

The tractors and agricultural machines come from various countries. The majority come from Western Europe, but there are also machines imported from the United States, the Soviet Union and Yugoslavia. There are also tractors that were mounted in Algeria. The average age of the agricultural machines is more than 5 years. The machinery is neglected and refers to the lack of organization and specialists.

The maintenance of the agricultural machines is supervised by the ministry of agriculture. The responsible control organ, the ONAMA (Office National du Matériel Agricole) has 29 larger central plants (UMA and CMA factories approximately two in each département) and 82 smaller shops subordinated to the central factories. According to the information obtained the total number of workers employed in the large factories is approximately 1500 while the small shops have 25 workers in average giving a total of 3500 persons engaged in the maintenance of agricultural machines. The equipment of the large factories is of good quality, the majority of the machines was designed and supplied recently by the Soviet Union. Assistance was also given in the field of the maintenance technology. At present a decentralization of maintenance system is planned. The large factories will be shut down. Although the agricultural machines are inspected, according to the information obtained by the Team, by inspectors authorized by the ONAMA, who decide whether the machine is serviceable and in case of defects make decisions as to the mode and place of repair, the members of the Team observed a lack of organization in this field and mainly in the small shops a lack of specialists and equipment. According to the survey and the information obtained the capacity and the technical possibilities

are not fully utilised in the large factories. At the same time in the shops there is a large number of unrepaired and neglected machines.

The detailed description of the situation of maintenance in the units repairing agricultural machines, visited by the Team is given in the enclosed reports (61.33-36 in 6. Appendix) and the summed up data are quoted in Table 6 (62.06 in 6. Appendix).

43 Traffic

43.1 Railway Traffic

The railway system and the rolling stock is of little importance. The railway system is a state owned enterprise that has a satisfactory maintenance service.

43.2 Highway Traffic

The highway system of the country is up-to-date and in good condition. The level is higher than that of those generally encountered in developing countries. In the country there are approximately 75 000 trucks, of which 45 000 are older than 5 years. The majority of the trucks is owned by state or industrial and agricultural enterprises. Maintenance is done by these enterprises in the already outlined manner. The approximately 90 000 cars and a small portion of the camions are maintained mostly by artisans.

44. Personnel

44.1 Availability of skilled personnel

The education of the engineers who graduated at some high-school is satisfactory. The basic training of the lower cadres, foremen, factory technicians and skilled workers does not attain, according to the Teams's observations

the required level and these persons have no sufficient workshop practice. There is a lack of trained specialists in every category. These statements apply to both the production and maintenance staffs.

The lacking specialists are replaced by foreign co-operators who occupy important leading posts (technical managers, leader of maintenance department, etc.).

It can be stated in general that where maintenance is organized well and carried out under the guidance of trained leaders, due care is also paid to the level of the training of the workers employed in that place. With maintenance organizations of low level also the training and practice of the employees are unsatisfactory.

44.2 Availability of training facilities

The basic and higher education (universities) are under direct control of the ministry of education.

The secondary education is controlled by the various ministries and the ministry of education has only the right of supervision. Consequently the students of the vocational schools for the training of skilled workers and foremen, the secondary technical schools and the specialized secondary schools or engineer schools are trained according to diverging concepts of the various ministries.

The team had no possibility to study the training system of the vocation schools and the informations concerning this question were very different as well as those concerning availability or the number of the yearly trained workers and foremen. However it seems, based on the surveyed factories, that these training facilities are

unsufficient. According to informations in plant training does not exist, skilled workers are trained only in vocation schools.

In the various secondary technical and engineer schools who are under the control of the ministry of industry, an annual total of approximately 500 technicians and 200 engineers absolves. Students of engineer schools are frequently sent abroad where they finish their study and become graduated. At the university of the country about 70 engineers graduate every year. The number of the engineers graduating abroad is not known.

45. Future policy

45.1 Survey of maintenance and repair needs and establishment of priorities

Having surveyed the situation, the opinion of the Team concerning the needs of maintenance and repair respectively their priorities is the following.

a/ organizing activity in the industry and in the field of agricultural machine's repair,

b/ extende the training of specialists,

c/ develope the existing maintenance and repair shops in the industry,

d/ establishment of central repair shops and spare parts storages and

e/ increase the volume of spare parts production.

45.2 Recommendations on the up-grading of existing facilities

a/ Centralization of guidance

It is necessary to establish central organs in each branch respectively section that will guide, organize

and supervise the maintenance activity. In this way it is possible to improve the quality of maintenance activity by the concentration of a small number of highly qualified specialists in these branches of industry in which the level of maintenance activity is low (e.g. mechanical industry, mining industry).

b/ Surveying the demand on maintenance, repair and spare parts supply.

The organs mentioned under a/ or specialists acting under the supervision of these organs have to go deeper in details of the demends, since maintenance activity can only be organized correctly and developed reasonably on the basis of such a deep study.

c/ Organizing the systematic preventive maintenance.

It is necessary to organize the systematic preventive maintenance on the basis of the survey mentioned under b/ that is laking with a small number of exceptions in the whole industry. The organization of maintenance has to cover also the establishment of spare parts stock standards.

d/ Developing the repairing shops.

The poorly equipped repairing shops have to be developed principally in the mechanical and mining industry by the reconstruction and extension of the machinery.

45.3 Recommendations on the establishment of new facilities

With regard to the heterogeneity of the productive machinery the establishment of central repair shops generally does not seems convenient, because the transport of the machines in the central shop must be difficult, the work of mobil service groups can't be successful except in

control and guidance work. The foundation of central repair shops for special works can be useful, e.g. to wind electrical motors.

45.4 Recommendations on improving existing stores and the establishment of new ones

The existing stores have mostly index-card file, but it should be completed with statement of minimal and maximal stock of stored spare parts.

Storage has to be centralized primarily in the case of the spare parts needed in large quantities and suitable stores have to be built. This allows the spare parts to be purchased and stored centrally.

45.5 Required training with establishment of priorities

As starting point the demand on skilled personnel should be stated. As the most of the difficulties derive of the field of skilled workers, the ministries of industry and of education should work out a unified training system.

The training of specialists has to be extended in each of the four main categories (skilled workers, masters, technicians, engineers) partly at home with the assistance of foreign instructors and partly in foreign companies and institutions of education.

45.6 Recommendations on the establishment of spare parts storage systems

The centralized storage system needs high grade organization and planning, on the other hand the development of a suitable recording system. Further it will be necessary to establish computing systems too.

45.7 Recommendations on the establishment of spare parts manufacturing facilities

a/ First step

The present situation in which a considerable portion of the spare parts are purchased from abroad may be maintained for a long time, since the foreign trade balance is favourable and the spare parts import makes up only a small portion of the whole import.

In the field of spare parts supply home possibilities must be better utilized. There are factories capable to produce spare parts, after partly replacing their outdated machines and their capacity is utilized actually below 50 %, e.g. in the two big industrial regions are SN Métal Unité Cote Rouge in the region of Algiers and Société des Atelier et Fonderies C. Ducros in the region of Oran.

b/ Second step

Any essential increasing of the spare parts producing capacity of the establishment of a central spare parts producing factory does not seem as expedient even later on, since it is impossible to ensure the necessary technical and economic level. Instead of this such mechanical factories (e.g. principally factories of machine tools, electric machines, agricultural machines) have to be established, that also serve the purposes of industrialization. These factories will facilitate a certain standardization of the heterogeneous machinery available at present and allow the outdated machines to be replaced by home-made machines. In addition these factories, producing also spare parts for the machines produced by them will be able to produce also spare parts for other machines by the same or a similar technology if the spare parts producing capacity is adequately dimensioned.

45.8 Organizing activity in the field of the repair of agricultural machines

Measures have to be taken to ensure a better utilization of the capacity of the existing central repairing factories. The district repairing shops should carry out only maintenance work and minor repairs under the supervision of the central factories. The repairing of machines may only be decentralized later on after the machinery is considerably increased and sufficient skilled workers are available.

45.9 Role that can be played by developed countries and by United Nations

For the improvement of maintenance activity and the organization work proposed both in the industry and the agriculture expert foreign co-operators have to be invited and for the establishment of the factories serving the purposes of industrialization and at the same time satisfying the requirements of spare parts production, the material aid of the UNIDO and of the developed countries is necessary.

46 Suggested Programme of Implementation

As to the temporal and importance sequence of the measures to be taken the following schedule is proposed. First step of the tasks to be fulfilled urgently: organisational activities quoted under 45.2 a/ b/ c/ and 45.8. As second step the extension of the training of specialists as quoted under 45.5 can be proposed.

The third step of the tasks to be fulfilled should be developing the industrial maintenance service; see points 45.2/d, 45.3, 45.4, 45.7/a.

A long-scale task is the increasing of the volume of the spare parts production and their storage as indicated under 45.6 and 45.7/b that can be fulfilled only later on in the frame of the general industrialization and development of the industry respectively.

As indication, corresponding to the opinion of the team, for the begin of maintenance and repair work, the tasks under point 45.2/a and /b, should be the starting points. However to accomplish these tasks the cooperation of foreign consultants is necessary besides the work of indigeneous specialists.

5 Terminal section

By summing-up the results of the survey it may be established that the difficulties encountered in the maintenance, repair and spare parts supply can be traced back to the practical lack of basic industries as well as to a cetain lack of organization and specialists.

On the basis of the share in the national income, the export and the number of employess it is only the raw material production, and within this mainly the oil production and ore mining, as well as the agriculture and the foodstuff industry processing one part of the agricultural products that may be considered as having an importance It is a fundamental deficiency that the production of the metallurgical and mechanical industry is very small, the factories are mostly outdated and have a restricted capacity. In the next future it is only the metallurgical industry that will be developed in a considerable degree by the putting into operation of the integrated metallurgy works of Annaba.

In the industry the level of maintenance and repair service is very different and with the exception of some branches mainly in the foodstuff industry, generally rather low. Systematic preventive maintenance is almost unknown and even in the factories having an effective maintenance and repair department it is being organized at present. Up to 80-90 % of the spare parts for the machines imported almost from abroad are purchased from abroad. This encounters difficulties in many cases.

In spite of the deficiencies existing in the maintenance no outfall of production could be experienced in the industry that had to be traced back to these deficiencies, since the existing capacity is not fully utilized first in the lack

of orders and then for the lack of skilled workers. (In many cases the capacity is only utilized up to 50 percent.)

In order to improve the maintenance activity and reduce the quantity of spare parts purchased from abroad the various branches want to establish their own central repairing and spare parts producing shops while in the mechanical industry a central repairing and spare parts producing factory is to be established that will satisfy the requirements of all branches. Because of the small lot sizes resulting from the heterogeneity of the machines neither of these concepts allows the realization of an up-to-date and economical production meeting every quality requirements. The agriculture has central repair factories that have the necessary equipment and personnel so that in these plants general overhauls can be performed and a certain quantity of spare parts produced. The available capacity of these plants is not fully utilized and in the future the utilization of the capacity will be further decreased, the machinery decentralized and the machines repaired mainly in the district repairing shops. For this work, however, the district repairing shops do not have necessary equipment and personnel and also the planned decentralization will not yield the desired results.

The proposals concerning the improvement of the maintenance and repair service as well as the supply of spare parts may be summed up as follows:

Better organization of the maintenance service in the industry
Development of the maintenance service in the industry
Increasing the spare parts production

Better organisation of the maintenance service in the agriculture
Extension of the training of specialists
Assistance rendered by the United Nations and the developed countries

The detailed description and the sequence of the recommendations determined by their importance is given in paragraph 45 and 46.

61.01 Direction de l'industrie sidérurgique, métallurgique, mécanique et électrique

General description

The direction of industry-branch is subordinated to the Ministry of industry and energy and controls the metallurgy as well as the general and electrical mechanical industry.

In the metallurgical section, that is co-ordinated by the metallurgical society SNS, there is now only one plant of importance, the ACILOR plant in Oran, that has a steel making capacity of approximately 30 000 tons/year and a small-section rolling mill for concrete steel production.

Under the direction of the SNS integrated metallurgy works are under construction in Annaba that will works up the iron ore coming from the mines in Ouenza and Boukadra with which it is connected by a direct railway line. The planned annual capacity of this combinate is 1,3 million tons of steel. The main units of the combinate are the blast furnace plant with blast-furnace of 800 m^3, the oxygen converter steel plant, the rolling mill and the tube factory. The plant is being built according to the most up-to-date principles of lay-out and will have an equipment of high technical level. It will have its own maintenance workshop, in which also all spare parts will be made with the exception of the special ones. The engineering for the investment of the combinate is provided by a Belgian company while the equipment for the various parts of the combinate are supplied by the Soviet Union as well as by various West German and French companies. The specialists of the combinate are being trained abroad and they will live in a residential quarter in the proximity of the combinate. It was planned that the combinate will be put into working in the middle of this year but according to the Team's opinion the work is behind schedule. The planned number of staff of the combinate is approximately 4 000.

The nationalized plants of the general and electrical mechanical industry that make up 30 to 40 percent of the branch are coordinated by the society SONACOM, while the enterprises with mixed or private ownership are under the direct supervision of the direction of industry-branch.

The total number of employees is 11 500 and the number of factories is more than 70. Consequently the average staff number is only approximately 160 and even the staff number in the larger factories does not exceed 400 to 600.

The essential concentration of the production either by establishing new large-capacity factories, or by increasing the capacity of factories that seem to be worth of developing and shutting down the small outdated plants was not even considered.

The level of the mechanical industry is rather low, owing to the dissipation, the partly outdated equipment and the small lot sizes, and is hard to improve without a fundamental change of the structure.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

The factories have their own repair facilities, more or less organized maintenance and spare parts storage with recorded stock.

The dissipation of the producing capacity as well as the machinery of very different provenance, age and character does not allow the maintenance and the spare parts supply to be centralized.

In spite of this the establishment of a new large central spare parts producing factory is planned and negotiations in this matter are in an advanced stage with a West-German company. It is

planned that the new factory will produce spare parts not only for the mechanical industry but last for the other branches of industry. However the spare parts requirement of the other branches is not surveyed and the plan meets the sharp protests of the leaders of the other branches who develop their own maintenance units and establish central workshops and stores that are partly their own.

b/ Adequacy of maintenance and repair facilities

The maintenance and repair facilities are mostly acceptable (see also descriptions 61,02-61,09 and Table 4. in 6. Appendix).

c/ Recommendations for improvement

The followings can be recommended:

Centralization of control and state of demand on maintenance, repair and spare parts supply

On base of above mentioned organization of systematic and planned, preventive maintenance and suitable storage-system

Extending of training facilities

Developing of existing repair and maintenance shops

Increasing of spare parts production, as indicated under 45,7.

Foundation of a new factory for spare parts production can not be considered as correct, as it is explained under 41,226.

61.02 ACILOR, Oran

General description

The factory works under the supervision of the metallurgical society SNS acting in the frame of the ministry of industry and energy.

The factory produces concrete steel of 8 to 25 mm diameter and has an annual capacity of maximum 30 000 tons.

Number of staff: 405.

The majority of the machines comes from France and Germany and the age of the machines is approximately 15 years on average. The liquid steel is made exclusively from steel-scrap. Steel is molten in one open-hearth furnace, that has a capacity of 30 tons and is fired with natural gas carburated with mazout. Control is made by hand on the basis of instruments.

Fuel consumption: approx. 1 300 000 cal/ton, output: approx. 0,2 tons/m2, charge cycle: 6,5 to 8 hours. Durability of refractory lining: 1300 charges. Magnesite roof. Ingot mould requirement: 17 kg/ton.

The furnace is charged with a charging truck.

Quality: steel of σ_B = 40 kg/mm^2 with a carbon content of 0,1 to 0,2 %. The quality is varying, and in general no quality requirement is raised.

The technology is moderately modern but complies with the small quantity and the low quality requirements.

The factory employees a French leader of production and a consultant.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organisation and spare parts storage

Maintenance work and the production of spare parts as well as the machining of the rolls are performed to a considerable extent within the factory. They have 15 machine tools of various kinds of up-to-date design. The rolls are machined by up-to-date methods.

Abraded rolls are reconditioned by welding under protective powder. The number of maintenance staff is 50. In the maintenance shop there are also sections for electrical installation, sheet work and building maintenance.

In spite of the above conditions repair and maintenance are in general occasional, except the yearly general inspection and overhaul, when the whole plant is stopped for two weeks. The systemetic preventive maintenance is being developed at present.

The factory has a well equipped spare parts store. The stock is registered with the help of an index-card file.

b/ Adequacy of maintenance and repair facilities

Corresponding the teams observation the technical level of maintenance work and the quality of the produced spare parts are satisfactory (see also Table 4.).

c/ Recommendations for improvement:

Development of systematic and planned, preventive maintenance. Index-card file should be completed with statement of minimal and maximal stock of stored spare parts.

61.03 Société Nationale de Construction Métallique (SN Métal) Unité d'Altelick, Annaba

General description

The factory is under the supervision of the mechanical society SONACOM acting in the frame of the ministry of industry and energy.

Annual capacity: manufacturing of approx. 300 various (passenger and goods) waggons and renovation of approximately 600 waggons. In addation the factory produces a small quantity of transport means, mainly belt conveyors and the joinery produces office furniture to utilize its exceses capacity. Apart from these also turntables are made for the central repairing factory of the mining society SONAREM. The reconstruction and extension of the factory has started and will yield a redoubling of the capacity.

The three main production units of the factory are the waggon construction and sheet working shop, the machine shop and the joinery. The basic and secondary materials as well as the spare parts are stored in a large central store.

The total number of staff is 600, of this 15 is the permanent staff number of the maintenance section. The manufacturing process is, in compliance with the small-scale production, moderately modern. Construction-work is done mainly by hand. The machine shop and the joinery may be considered as being up-to-date. The mostly universal machine tools are gradually replaced by up-to-date models.

The factory has approximately 150 machines. Of these 30 are wood working machines (completely new ones), 60 different machine tools (aged 1 to 30 years) and 50 different transport equipments (cranes, etc.), sheet working machines and miscellaneous auxiliary machines.

The majority of the machines comes from various countries in Western Europe, while the new machine tools were partly made in the Societ Union.

In the factory, 12 Soviet co-operators have worked for 3 months. They act as consultants in the production, then in the organization of the maintenance service and in the reconstruction work in process.

The organization of the production is not yet satisfactory. The producing capacities of the various units are not harmonized and the maintenance activity is not organized properly. The number of machine tools seems to be too large even with regard to the conditions that will exist after the reconstruction.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

The factory has no maintenance workshop. The maintenance personnel has a small room where minor parts can be repaired.

The machines are repaired and assembled on the spot and the majority of the necessary spare parts is purchased and stored in the central store, respectively. A certain quantity of spare parts is produced mainly occasionally in case of necessity on the productive machines the capacity of which is not fully utilised.

There is no systematic preventive maintenance but the care (lubrication etc.) to the machines is systematic. On the occasion of the annual general stoppage of the factory the machines are subjected to a thorough inspection and the defective parts are replaced according to necessity. The quantity of spare parts and the schedule of purchasing are not fixed. The stock is registered in an orderly kept and easy-to-survey card-index file. The requirements are established on the basis of experience and estimates.

b/ Adequacy of maintenance and repair facilities

The maintenance and repair facilities can be considered as unsatisfactory (see also Table 4.), resulted at first from the unfavourable conditions.

c/ Recommendations for improvement

Establishment of a well equipped separate maintenance and repair shop with skilled personnel. The quantity of spare parts to be purchased could also be considerably cut if one part of the existing machines would be used for maintenance purposes and regrouped in the maintenance and repair shop.

Organizing of systematic and planned, preventive maintenance. Completing of the storage index-card file stated minimal and maximal quantity of spare parts to be stored.

61.04 SN Métal, Unité d'Annaba

General description

The factory is under the supervision of the mechanical society SONACOM acting in the frame of the ministry of industry and energy.

The factory manufactures steel constructions, building locksmith-work, containers and other sheet constructions. The steel building constructions are assembled by the plant's own assembling staff on the building site and complemented with covering and roof covering elements purchased from elsewhere. Among the products of the factory are e.g. power plant buildings housing 4 high-capacity boilers, airport reception buildings, factory halls, etc. The architectural plans of the buildings are made in the plant's own designing section.

The production volume changes according to the character of the orders. On average approximately 1 000 tons of rolled material are used up every months.

The total number of staff is 390, of which 200 work in the shop, 160 perform assembly work and 30 are leaders. Of the shop staff, 15 are engaged in maintenance work.

The factory was recently developed. The steel constructions are manufactured in a new up-to-date shop that was built from steel constructions made in the plant itself. To the steel construction and sheet work they have approximately 25 machines most of which are completely new. They are various cutting, rolling, straightening, bending and welding machines. The containers are heat-treated in a furnace provided for the purpose.

The production is up-to-date and well organized. The technical level of the plant may be considered as very good. In the plant 15 French co-operators are holding various leading posts.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

The maintenance work is done systematically. Minor spare parts are manufactured in a small machine shop equipped with 6 different universal machine tools. Approximately 85 percent of the spare parts are purchased from the makers of the machines with a total annual value of approximately 200 thousand DA. In the central store 3 months' spare parts are stored. The stock is completed i.e. the necessary spare parts ordered on the basis of the machines periodical supervision.

b/ Adequacy of maintenance and repair facilities

The technical level and organization - as in the whole plant - may be considered as very good, the facilities are satisfactory (see also Table 4.).

c/ Recommendations for improvement

Due to the good conditions it's nothing important to be recommended.

61.05 SN Métal Unité Cote Rouge
(Former name: NEYPRIC-D'AFRIC)

General description

The factory works under the supervision of the mechanical society SONACOM acting in the frame of the ministry of industry and energy.

The factory was a subsidiary of the French company NEYPRIC (Grenoble). It was nationalized but it has continued to co-operate with the parent company.

The factory produces steel constructions and heavy machinery, for barrages harbour equipment.

Production volume: 4000 to 5000 tons/year with a value of approximately 20 million DA.

Number of staff: 300.

The factory is clean arranged and modernly equipped.

This applies particularly to the steel construction shop. In this shop there are approximately 15 various up-to-date sheet working machines (edge bending machines, rolls, sheers, etc.) with an average age of 10 years.

In the machine shop there are approximately 20 heavy-duty universal tool machines (large horizontal lathes, large milling and planing machines) having an average age of 20 years. The machines are used in one-off production and meet the requirements raised on them. The reconstruction of the machinery is in process. The factory also have approximately 20 light-weight machine tools but these machines are outdated.

The factory manufactures its products partly on the basis of its own design (the designing section has a staff of 30) or on the basis of French licences.

The factory is well organized and productive.

Description of repair and maintenance

a/ **Existing repair facilities, maintenance organisation and spare parts storage**

Maintenance work is performed by a separate section having a suitable staff of 12 skilled workers. A certain quantity of spare parts is produced on the productive machines the capacity of which is not fully utilized. Maintenance is not organized systematically, the machines are repaired only yearly during the vacation or in case of a defect. The necessary quantity of central stored spare parts is not fixed. The card-index file serves only for registration.

b/ Adequacy of maintenance and repair facilities

The maintenance and repair facilities can be considered generally as acceptable (see also Table 4.).

c/ Recommendations for improvement:

Organizing of systematic and planned, preventive maintenance
Utilization of existing capacity for spare parts production, after replacing the outdated machines
Completing of storage index-card file stated minimal and maximal quantity of spare parts to be stored.

61.06 CABLAF, Algiers

General description

The factory works under the supervision of the mechanical society SONACOM acting in the frame of the ministry of industry and energy.

Two factories, CABLAF and LATRAF, were formerly one enterprise but now they are organizationally independent of each other. There is a division of labour between the two factories: CABLAF manufactures wires, uninsulated wirecables and cables as well as overhead conductors of copper and aluminium and LATRAF provides the same with insulation.

Production volume: 300 to 320 tons per month. Its capacity is utilized only to approximately 60 percent owing to the lack of orders.

Number of staff: approximately 205.

The factory is equipped with conventional wire drawing and cable stranding machines. They are not quite up-to-date and have an average age of 15 years.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

The factory has a separate maintenance workshop equipped with 8 different universal machines. There is a well equipped spare parts store with registration.

b/ Adequacy of maintenance and repair facilities

The maintenance and repair facilities also training of the maintenance staff and level of the work can be considered as acceptable (see also Table 4.) and as suitable to the requirements.

c/ Recommendations for improvement:

Organizing of systematic and planned, preventive maintenance

61.07 LATRAF, Algiers

General description

The factory works under the supervision of the mechanical society SONACOM acting in the frame of the ministry of industry and energy.

LATRAF envelop with insulation approximately 60 percent cables and wires produced in the co-operating enterprise CABLAF (see description 61.06). The range of products includes oil and plastic as well as rubber and plastic insulated conductors.

The number of staff is approximately 150.

The machines having been purchased from different countries are out of date. The partial modernization of the factory is planned, although at present only 50 percent of its capacity is utilized.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

The organization of the maintenance activity is poor although some reconditioning work begins within the plant.

The cables and wires have a great variety of insulations so that if the machines used to apply some kind of insulation become defect, production need not be stopped because until they are repaired cables and wires with other kind of insulation are made.

The storage of spare parts is unsystematical. The necessary stock is established by experience.

b/ Adequacy of maintenance and repair facilities

The maintenance and repair facilities can be considered generally as unsatisfactory (see also Table 4.) at first due to the outdated conditions.

c/ Recommendations for improvement:

Replacing of outdated machines
Organising of systematic and planned, preventive maintenance
Improving of storage system with suitable index-card file.

61.08 Union Industrielle Africain S.A., Algiers

General description

This plant with mixed (50 percent private and 50 percent state) ownership works under the supervision of the branch direction of the ministry of industry and energy.

The factory has two main producing units: the foundry with an annual capacity of approximately 4000 tons of iron castings and approximately 100 tons of light and heavy metal castings, and the iron construction shop. Apart from these there is also a smaller machine shop in which besides of ordinary production a certain quantity of spare parts is made.

The producing activity of the plant is manifold. The foundry produces castings used in building and sewage construction as well as various cast machine parts and commercial castings. One part of these is built in other products of the factory while the rest is made as commision work. The steel construction shop produces containers, trailers for the transportation of oil boring towers and other sheet and steel constructions and on order the machines are assembled in this shop.

The total number of staff is 300, of which 200 work in the foundry, 50 in the iron construction shop, 30 in the maintenance and in the machine shop and 20 are leaders.

The foundry is moderately mechanized. In the melting shop there are two hot-blast type cupolas with primitive charging. In the moulding area the moulds are made with outdated jolt-squeezing moulding machines and transported on a roller conveyor. The sand is prepared in the outdated central sand preparing shop. The core making and cleaning machines are up-to-date. The machines of the foundry come mainly from France and also from West Germany and have an age 3 to 20 years. The replacement of the moulding machines is planned.

The steel construction shop is out-of-date, work is done by hand, and most cutting work is performed with the help of flame cutting apparatus.

The machine shop is equipped with 12 universal machine tools of different ages.

The majority of the fixed assets are already amortized and therefore the sum of 800 000 DA quoted as the actual value of the machinery purchased from various companies in various countries is not authoritative, since the purchasing value is, if a similar level is supposed, approximately 15 to 20 times the quoted sum. The value of the spare parts purchased every year amounts to approximately 500 000 DA, but this sum also includes one part of the secondary materials.

The quantity of machines is too large in comparison with the actual production. The foundry has e.g. 50 percent more moulding machines than necessary. The capacitiy can, however, not be increased without a rearrangement or reconstruction, respectively the transport means harmonize only with the machines that are actually involved in the production process.

It may be established, in general, that the organization of the factory is not satisfactory. Attention is concentrated on the fulfilment of everyday's production tasks, but the maintenance, the machinery and the training of the staff are not satisfactory and the activity of the factory is fair from being systematic.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

The factory has no separate maintenance shop, the maintenance of the machines is performed on the spot. There is no systematic preventive maintenance and the machines are inspected and re-

paired only during the two weeks' stoppage of the whole factory. All other repair are performed when a fault or trouble occurs. The required size of the stock in the spare parts store is not established and the quantity and schedule of purchase are more or less unsystematic.

b/ Adequacy of maintenance and repair facilities

The maintenance and repair facilities can be considered as unsatisfactory (see also Table 4.), at first due to lack of suitable organization.

c/ Recommendations for improvement:

Establishment of a well equipped separate maintenance and repair shop with skilled personnel.
Organising of systematic and planned, preventive maintenance included just the suitable storing system too.

61.09 Société Nouvelle des Atelier et Fonderies C. Ducros, ORAN

General description

The enterprise is a French private property and works under the supervision of the branch direction of the ministry of industry and energy.

The main producing units of the factory are the following: steel construction shop with a monthly capacity of 100 tons, steel foundry with a monthly capacity of 100 tons, iron foundry with a monthly capacity of 300 tons, as well as a machine shop with approximately 40 different universal and special machine tools and a heat-treatment shop. The steel construction shop is also an assembly shop. The producing shops are complemented with a patternmaking shop and a small meintenance workshop.

The producing activity is manifold. With the machines of the plant it is possible to manufacture a great variety of machines, steel constructions, containers, steel and iron castings. The capacity is only utilized to approximately 50 percent and the orders obtained by the plant allow only a programming of two months on average. The great variety of the orders does not allow the organization of series production, although the factory is equipped for this type of productive activity. The factory is e.g. capable of manufacturing tractors, owing to its special metal working machines that were purchased only they are not put into operation in the lack of orders.

The total number of staff is 260, of which 18 are engaged in maintenance work. The products manufactured in the factory are designed in the plant's own designing section having a staff of 15.

The machines of the machine shop show a great heterogeneity. The age of the machines, coming mainly from France, varies between 1 and 50 years. Accordingly, their technical level is very different, nevertheless the shop can be considered as being relatively up-to-date and efficient.

The steel construction shop is equipped very well. It has approximately 10 different sheet and sectional steel working and welding machines.

The iron foundry is the most out-of-date shop of the factory. The melting equipment and the machines of this shop are outdated, the level of material handling and the technology used in the production is very low.

The equipment of the steel foundry may be considered as up-to-date with the exception of material handling. The technology is of high level and even the latest technological methods are used.

It may be generally stated, that the factory is organized very well and may be considered, under Algerian circumstances, as being of high level.

By a suitable reconstruction the actual capacity could be increased considerably, but no further development is not planned. If the volume of production was increased the employment of the required number of specialists would cause a problem, since the specialists are sufficient even now only quantitatively, the level of their training is not satisfactory and this is reflected by the low productivity and sometimes also by the inferior quality.

The great variety of the machines would allow a manufacturing of spare parts for other factories and the performance of general overhauls, but there is no demand to be met although the factory has an abundant surplus capacity that could be utilized.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

The maintenance is systematic and preventive. The machines are inspected and checked at regular intervals. On these occasions also the necessary repairs are performed. Approximately 50

percent of the spare parts are manufactured in the factory's own machine shop, where there is an abundant capacity for this purpose. The spare parts manufactured in the plant and purchased elsewhere are stored in the central store.

b/ Adequacy of maintenance and repair facilities

The maintenance and repair facilities are on high technical level and can be considered as satisfactory (see also Table 4.).

c/ Recommendations for improvement

Existing capacity is not utilized due to lack of order. It could and should be utilized for spare parts production. Due to the good conditions it's not other important to be recommended.

61.10 Direction de l'industrie des matériaux de construction et divers

General description

The direction of industry-branch controls the industry of building materials and various smaller sections of industry (paper, glass, etc.). The importance of these latter is little, the plants are outdated and have a small capacity.

In the building material industry 7 000 persons are employed. The majority of them is engaged in brick and prefabricated concrete production. The brick factories are, as it was seen by the Team, outdated plants using almost exclusively manual work and a single round brick-kiln and serve only to meet local demands. Up-to-date building construction is characterized by reinforced concrete buildings with a considerable quantity of prefabricated elements that require an adequate quantity of plants where the prefabricated elements are made.

Accordingly, the most important factories of the branch of industry are the cement factories and the prefabricating plants utilizing the products of the cement factories. The cement is produced in two factories. One of them is in Algiers. This factory supplies approximately 80 percent of the production and works at an up-to-date level. The second factory is in Oran that produces 20 percent of the total production with outdated equipment and technology.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

The maintenance is systematic and preventive in the Algiers cement factory. In this factory also a certain quantity of spare parts are made. In the other units there are only small repair shops and the maintenance activity is mostly insignificant.

It is planned that in order to improve the maintenance work in the remaining plants and to extend the spare parts producing capacity a central maintenance and spare parts producing shop will be established. In this case the factories will have only small maintenance sections that will be based on the central spare parts supply and perform only assembly work.

This should also solve the problem of missing specialists in the field of maintenance, since the specialists having the required training could be concentrated in the central maintenance and spare parts producing shop.

b/ Adequacy of maintenance and repair facilities

The maintenance and repair facilities can generally be considered as unsatisfactory except in the cement factory of Algiers, where they are satisfactory (see also in description 61.11 and Table 4.).

c/ Recommendations for improvement

The followings can be recommended:
Centralization of control and state of demand on maintenance, repair and spare parts supply, after that organization of systematic and planned, preventive maintenance and suitable storage-system at first in those factories which will be up-to-date.
Development of existing repair and maintenance shops.

Establishment of central repair and spare parts producing shop does not seems to be convenient, because it could not be economical, if not for special works and control of the factory-owned shops.

61.11 Cimenterie Pointe Pescade, Algiers, Pointe Pescade

General description

The factory is subordinated to the direction of the industry of building materials of the ministry of industry and energy.

The factory produces annually 500 000 tons of Portland cement of grade 325. The raw material is drawn from the own quarry and transported by the own trucks into the factory. The factory has a suitable maintenance workshop and spare parts store. The factory is highly mechanized, and in a considerable degree centrally controlled and automatized, respectively.

The number of staff is 186, of which 56 work in the quarry, 60 in the productive shop and 70 in the field of maintenance.

The value of the fixed founds is 50 million DA, of which the value of the machinery and kilns is 33 million DA.

The average age of the machinery is 15 years. The equipment of the quarry was imported from the United States, while the equipment of the factory comes from various countries in Western Europe.

The clinker production is controlled from a central control room, the processes are indicated by a control panel and the production is registered by instruments. Also the well equipped laboratory serves for control purposes. Material handling is completely mechanized from the admission of the raw material to the filling of the bags and container waggons, respectively.

The production manager of the plant and the head of the maintenance section are Soviet specialists and some more Soviet experts work in the plant.

It may be established as a general valuation, that the technical level and the organization of the plant are very good.

Description of repair and maintenance

a/ **Existing repair facilities, maintenance organisation and spare parts storage**

The systematic preventive maintenance is organized well. The machines and the equipment are inspected at regular intervals, the necessary maintenance and the minor repairs are carried out continuously. Once a year the whole plant is stopped for two weeks, in which time the machines are subjected to a thorough inspection and overhaul. The spare parts store pertains organizationally to the maintenance section.

The maintenance workshop has a machine shop, a sheet working, an electrical installation and an assembly section. The workshop is equipped with 11 machine tools that work annually for approximately 1 800 hours on average. Apart from the assembly and repair work also a certain spare parts production (covering approximately 20 percent of the required quantity) is performed in this workshop. Among others the spare switches of the pneumatic transport means are made in the maintenance workshop. It is characteristic of the high level of the maintenance work that even the maintenance and repair of the electronic control equipment are performed by the maintenance staff.

The stock of the spare and wearing parts store is registered with the help of an index-card file and the spare parts are purchased on the basis of the registration. The annual value of the purchased spare parts is as high as 3 million DA.

b/ Adequacy of maintenance and repair facilities

The maintenance and repair facilities can be considered as satisfactory (see also Table 4.).

c/ Recommendations for improvement

Due to the good conditions it's nothing important to be recommended.

61.12 Direction des industries chimiques, textiles, cuirs et peaux

General description

The direction of industry-branch controls the chemical, textile and leather industry. Since in the various sections 70 to 80 percent of the factories are private property, central control is restricted to a certain degree of supervision and registration.

The majority of the factories has a small capacity and outdated equipment. Recently some up-to-date plants with a larger capacity have been established from central funds thus e.g. the textile factory in Tiaret employing 3 000 workers.

Number of the persons working in the sections under the guidance of the direction of industry-branch: chemical industry - 4 000, textile industry - 9 000, leather industry - 3 000.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

Because of the dissipation of the factories and the heterogeneity of the machines as to their origine and state, the spare parts are generally purchased from the makers of the machines. The maintenance staffs of the factories are only equipped for the care of the machines, minor repairs and the replacement of defect parts. Maintenance work is in general not well organized.

The development plan of the direction of industry-branch includes the establishment of a central spare parts manufacturing and supplying shop.

b/ Adequacy of maintenance and repair facilities

The maintenance and repair facilities are - according to informations - mostly unsatisfactory except the up-to-date new factories (see also Table 4.).

c/ Recommendations for improvement

The followings can be recommended:

Centralisation of control and state of demand on maintenance, repair and spare parts supply

Organizing of systematic and planned, preventive maintenance and suitable storage system

Developing of existing repair facilities

Training of skilled personnel

Establishment of central spare parts producing shop can be considered as efficient if the production will be concentrated and the equipment uniformized to a certain degree.

61.13 Mining society SONAREM

General description

This society is subordinated to the ministry of industry and energy and controls all sections of mining, with the exception of oilfields, including the research, the exploration and the production, as well as the development and maintenance. The activity of the direction covers the mining of coal, iron, lead, zinc, copper, tungsten and pyrite ores as well as of phosphate and barite, to mention only the most important products. Recently also mercury, marble and bauxite mines were opened. The total number of staff is 6 000.

One part of the mines became outdated and partly outputted after the country became independent and the mines were nationalized, but it was necessary to continue operating both these mines and that ones shut down earlier for economical reasons so that the number of employed people could be increased. The recently explored mines and the ore sources to be explored in the future (e.g. the large iron ore deposit in Tindouf) are affected with partly investment, partly with transport problems. Thus some mines can be worked or put into service economically in co-operation with Morocco (transport and ore dressing in Morocco).

Before the nationalization most of the mines were independent enterprises. The majority of the equipment is of different provenance and was already outdated at that time. Thus e.g. each of the seven compressors of a certain mine was supplied by a different company.

During the seven years since the proclamation of the independence of the country only the central organ was developed but the mines do not obtain any remarkable central guidance. Thus e.g. the fixed funds of the mines were not inventorized up to now. A Hungarian co-operator, a mining engineer is entrusted to work out the method of the inventorization and the valuation of the fixed funds till the end of this year. Thus the inventorization and the valuation can

only be performed thereafter. Consequently the typisation of the equipment can only be organised later on.

As a consequence of the going out of date and heterogeneity of the equipment and the unsatisfactory maintenance that may be traced back in a certain degree the two factors mentioned first there are many accidents and operational faults and stoppages mainly in the small mines.

Because of the compulsion of the production little attention was paid to exploration. Consequently in most places the sources are not explored and mapped sufficiently so that the production have uncertain bases.

A large number of foreign co-operators from various developed countries is engaged. In the solution of the problems linked with the exploration, production and organization. In addition to this agreements are made with various countries to explore and exploit the sources commonly. (E.g. in case of lead and zinc ore with the Soviet Union, and in case of other non-ferrous metals and rare metals with Roumania.)

Description of repair and maintenance

a/ Existing repair facilities, maintenance organisation and spare parts storage

Most of mines are small and outdated, according to their technical level, their maintenance activity is also insignificant. The up-to-date mines, e.g. Ouenza have well equipped repair and maintenance shops and systematic storage of spare parts /see also descriptions 61.14-15./. There is also a plan of establishing a central spare parts producing plant however the fixed funds are not yet inventorized and valuated.

b/ Adequacy of maintenance and repair facilities

The maintenance and repair facilities are - according to informations - unsatisfactory except some up-to-date mines e.g. Ouenza (see also Table 4.).

c/ Recommendations for improvement

The followings can be recommended:
After having finished the inventorization, control should be centralised and the demand on maintenance, repair and spare parts supply should be stated.
Organising of systematic and planned, preventive maintenance and suitable storage system, at the same time amelioration of existing facilities in those mines which will be developed
Training of skilled personnel
Necessity of central spare parts producing plant establishments can be estimated after invetorization and statement of demand.

61.14 SONAREM Mines Ouenza (iron ore mine)

General description

The mine is under the control of the mining society SONAREM acting in the frame of the ministry of industry and energy.

The Ouenza mine and nearly the mine of Boukadre led by the local mine direction supply approximately 75 to 80 percent of the country's total iron ore production. The Team visited the more important Ouenza mine, that yields with its daily production of 5000 tons 50 to 55 percent of the country's total production.

In the Ouenza mine the ore is worked by open-cut mining in a yard opened aerlier along approximately 10 walls of 15 m height each. Recently another yard was opened. The majority of the ore produced is hematite with a Fe content of 53 percent on average and a basicity of 1.02. The sale of the finer fraction obtained in crushing and of the siderite contained in the covering layer encounters difficulties. There is a plan to purchase a pelletizing plant to agglomerate the fine grain ore.

The number of staff is 1800, of which 500 persons are engaged in the production, 600 in the transport, 400 in the maintenance, repair and storage, and 300 in the central direction.

The most important units of the mechanical equipment of the mine are the boring equipments mounted on trucks, approximately 12 excavators powdered by electricity or diesel engines with a bucket capacity of up to 1.8 m3 /purchased from six different companies/, approximately 40 tipping trucks and dumpers with a load carrying capacity of up to 40 tons /from 5 different makers/, a 2400 m long and 1 m wide rubber belt conveyor with a capacity of 1000 tons/h and a speed of 1.4 m/sec., that reverses both vertically and horizontally and transports the ore out of the recently opened yard, as well as cone crushers, sorting arrangements, belt conveyors and loading equipment. The average age of the machines supplied by a great number of makers is 15 years.

The organization of the mine seems to be satisfactory. The mine employs a number of foreign (Soviet, French etc.) co-operators.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

The maintenance organization consists of three main units. These are the service shop, in which the vehicles are maintained, inspected and repaired (minor repairs), the maintenance and repair shop, in which general overhauls are performed and a certain quantity of spare parts is manufactured, and the central store where the spare and wearing parts but also various secondary materials are stored.

In the service shop the vehicles are inspected at regular intervals. The staff of this shop performs the necessary care (washing, lubrication, etc.), replaces the tyres and performs minor repairs.

Major repairs and the general overhauls are performed in the maintenance and repair shop. It is in this shop that a certain small quantity of spare parts are also manufactured for both the vehicles and the machines of the mine. The stationary machines are generally repaired on the spot. The maintenance and repair shop comprises the following main units: machine shop with 20 different universal machine tools (8 different makes) of which 60 percent are aged 5 to 10, and 40 percent 10 to 50 years, engine assembly shop, engine test room with two brake benches and fuel injection nozzle testing apparatus, electrician's workshop with transformer repair and winding section (up to a motor output of 200 kW), sheet workshop in which the bodies of the vehicles are repaired and reconditioned and various sheet and steel construction works are carried out, welding section, forgery with two forging and one die hammer.

In the central store the necessary spare parts and chemicals are stored. In the maintenance and repair shop and in the service shop

there are buffer stores. The stock is registered with the help of a systematically kept and easy to survey index-card file. For the important materials and spare parts as well as for those of which larger quantities have to be stored the cards indicate the minimum quantity that must be stored.

b/ Adequacy of maintenance and repair facilities

The maintenance service and its system seem to be good and efficient. Although there is no written maintenance plan, the standards developed out of practice ensure that the various maintenance units are continuously busy and that the machines operate without any trouble.

Generally the maintenance and repair facilities can be considered as satisfactory (see also Table 4.).

c/ Recommendations for improvement

It would be convenient to uniformize the heterogeneous machines to a certain extent and thereby facilitate the purchase of the special spare parts.

Due to the good conditions it's not other important to be recommended.

61.15 SONAREM Mines Ouenza, Installations portuaires Annaba

General description

Under the control of the mining society SONAREM acting in the frame of the ministry of industry and energy.

The plant consists of two units. These are the ore loading unit, in which the ore transported by railway is loaded into ships and a workshop for various purposes, in which the ore transport waggons are inspected and repaired and minor transport facilities (e.g. belt conveyors) are manufactured for the ore loading unit. Also a small quantity of spare parts is produced in this workshop. For the ore transport there are 271 waggons each of which is subjected annually to an inspection. On the same occasion the waggons are also repaired if necessary. The number of the whole plant's staff is 220, of which 100 work in the loading unit, 100 in the workshop, and 20 are leaders. The number of maintenance staff is 15 in the loading unit and 3 in the workshop.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

The workshop is out of date and crowded. 60 percent of the 20 machines come from different makers and have an average age of 30 to 50 years. The spare parts needed for the waggon-repairs are partly manufactured in the workshop itself, partly (e.g. wheel rims, brake blocks, etc.) purchased. The workshop is equipped so that the abroaded treads of the wheels can be replaced by welding and machined. The sheet-work section repairs and reconditions the waggon bodies.

The productive and loading equipment of the plant is maintained by the 18 persons mentioned in the preceding. Since the activity of the workshop is almost completely restricted to maintenance, it has no separate maintenance section. The spare parts are purchased (with the exception of a very small quantity) and the maintenance

activity consists of machine care, machine assembly and electric installation work.

Among the plans of development there is the establishment of a foundry in which mainly brake blocks will be produced.

b/ Adequacy of maintenance and repair facilities

The workshop is capable of performing the necessary repair works, however it's level can be considered as unsatisfactory (see also Table 4.), resulted at first from the outdated equipment.

c/ Recommendations for improvement

Replacing of outdated equipment and establishment of the above mentioned foundry can be recommended.

61.16 Direction de l'industrie alimentaire

General description

The direction of industry-branch is subordinated to the ministry of industry and energy and co-ordinates the factories of the food industry. The factories of which 70 to 100 percent are nationalized, are concentrated in the societies of sections. These societies have a considerable independence, only supervised by the ministry. The factories in private property are subordinated directly to the ministry.

The total number of persons employed in the food industry is 15 500. The branch is one of the important factors of the economic life and a considerable portion of the products is exported.

After a short information in the direction of industry-branch the Team obtained detailed information in the societies of sections and in the visited factories.

Description of repair and maintenance

Existing facilities, estimation of adequacy and recommendations for improvement detailed see in descriptions 61.17-31 and Table 4.

The direction should take the initiative for realization of recommendations.

61.17 Society of vegetable oil industry SNCG

General description

This society comprising 95 percent of the section is subordinated to the direction of food industry of the ministry of industry and energy.

The products are cooking oil, margarine, soap. The section has 9 factories.

The total number of employees is 1800.

The machines are very different and have an age of 1 to 50 years. 20 percent are less than 10 years old, 40 percent are 10 to 15 years old and the rest is outdated. The machines come from various countries, mainly from Western Europe.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

The maintenance activity is moderately organized. The factories have own maintenance sections. The factories are generally stopped for one month every year. During this time the machines are repaired. The maintenance is neither systematic nor preventive. The spare parts are purchased mostly from abroad, a little part from home plants. In this field no special difficulties were encountered (see also descriptions 61.18-19).

It is planned to establish a central maintenance shop complete with a spare parts store in the course of the year 1969. The central maintenance workshop is being developed and one part of it is already put in service. The trucks of the factories are maintained by the own maintenance staffs.

b/ Adequacy of maintenance and repair facilities

The maintenance and repair facilities can be considered as unsatisfactory (see also Table 4.), resulted from lack of experience of skilled workers.

c/ Recommendations for improvement

Organising of systematic and planned, preventive maintenance and suitable storage system

Developing of existing repair facilities

Training of skilled personnel

Control of factories-owned repair shops and making of special works should be the main business of the central maintenance shop.

61.18 SNCG, cooking oil refining and packing factory, Algiers

General description

The factory works in the frame of the society of vegetable oil industry SNCG.

The team was permitted to visit the factory but the questions concerning the capacity, the staff number, etc. were replied by polite but evasive answers.

The age of the machines and equipment ranges from 10 to 15 years.

Modernization is carried on from own resources with equipment made in the plant. The electrical equipment is novates and central control stands installed.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

There is a maintenance section in the factory. Maintenance is occasional. The manager of the factory is a Frenchman.

b/ Adequacy of maintenance and repair facilities

The maintenance and repair facilities - according to observations - can be considered as unsatisfactory (see also Table 4.).

c/ Recommendations for improvement

Organisation of systematic and planned, preventive maintenance and suitable storage system
Training of skilled personnel

61.19 SNCG, central maintenance shop

General description

The shop works in the frame of the society of vegetable oil industry SNCG.

At present the shop is being developed (constructed). The manager who is also the designer of the plant is a French engineer.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

The actually working sections of the central maintenance shop are the car maintenance shop, the machine shop (7-8 machine tools), the building maintenance section and the central spare parts store.

The actual number of staff is approximately 70, the planned number is 90.

In addition to these, approximately 300 persons are engaged in maintenance work of the various units. These are guided from the central workshop. The whole shop is led by the above mentioned French engineer.

Special difficulties are encountered neither in the field of skilled workers nor in the field of spare parts supply. The situation is the same as in the other plants of the country.

b/ Adequacy of maintenance and repair facilities

The maintenance and repair facilities can be considered as acceptable (see also Table 4.).

c/ Recommendation for improvement:

Organizing of systematic and planned, preventive maintenance and suitable storage system

Control of factories-owned repair shops

61.20 Society of milling industry and for farinaceous products making

General description

The society is subordinated to the direction of food industry-branch of the ministry of industry and energy.

Its activity covers the production of milling products, farinaceous products and children foods. To the 11 district directions 85 factories are subordinated making 95 percent of the sections production.

The total number of employees is 7000.

It is planned to reconstruct and extend several factories and establish new factories up to 1970. The plan also provides a reasonable concentration of the factories connected with the shutting down of certain outdated factories.

The existing and the planned machinery comes from a great variety of sources. The average age of the machines is 15 years but there are also 1-2 and 50 years old machines. No uniformization is planned.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

The factories have their own repair shops. It is planned to establish a central repair and spare parts producing shop and to organize the systematic preventive maintenance. A central spare parts store exists already at present. Sections are transferred in certain plants, that will also remained after the reorganization. The spare parts are purchased from the producers of the machines.

The importation of the spare parts necessary for the machines the age of which does not exceed 10-15 years encounters in principle no difficulties. Difficulties exist with the older machines, but these are already amortized and will be replaced in the frame of the reconstruction. The total value of the annually imported spare parts amounts to approximately 300 thousand DA. Difficulties exist in the granting of the foreign currency, since there are very long waiting times (2 to 3 months). As a result of this the term of delivery is generally unfavourable for the break-down free running of the plant (see also descriptions 61,21-22).

The specialists including the maintenance specialists are trained within the factories.

b/ Adequacy of maintenance and repair facilities

The maintenance and repair facilities can be considered as unsatisfactory (see also Table 4.), resulted at first from lack of experience.

c/ Recommendations for improvement

Employment of foreign specialists in the factories and the delegation of home specialists to similar factories in foreign countries for experience-collecting and further training.

Organizing of systematic and planned, preventive maintenance and suitable storage system
Development of existing repair shops
Establishment of central repair and spare parts producing shop can only be recommended for control and special works.

61.21 SEMPAC, Mills, farinaceous food-stuff and children-food factory Blida (district direction)

General description

The district direction acts in the frame of the society of the milling industry and farinaceous food-stuff making SEMPAC. In the seat of the direction there are two locations with four main units. These are complemented by stores and further mills in the environment. The factories situated in the district of the centre are the following:

a/ Factory for farinaceous products and children-foods
The factory produces baby-foods, macaroni and other farinaceous products.

Daily capacity: processing of 40 tons of meal.

The majority of the machines are Swiss makes and have been used for 1 to 2 years.

The baby food making machines were a present of the UNICEF made to the Algerian children in 1968. The plant is up-to-date, well organized and automatized up to 80 percent, included also the packaging and storage. The plant is in enlarging by a further unit for farinaceous products (baby foods) from own resources. The planned increase of capacity is 10 to 12 tons/24 hours.

b/ Mill unit I

The mill is located next to the unit dexcribed in the preceding part and serves to supply meal to the same.

c/ Mill unit II

I is located in another place and produces various kinds of meal and semolina. Capacity: 110 tons/24 hours.

The machines are 40 to 50 years old with the exception of some machines. They have a wooden covering and also the chutes are made of wood. Transport is pneumatic.
Both units are maintained and managed well.

d/ Auxiliary plants

The factory for farinaceous products and mill unit I have an up-to-date oil-fired boiler plant and a less modern air compressor plant. The two units have approximately 30 trucks in common. The factory has own maintenance shop. The permanent number of staff of units a/, b/ and c/ is approximately 700.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

There is no systematic and preventive maintenance and maintenance work is occasional.

The factory for farinaceous products and mill unit I have a stand-by maintenance shop and store and mill unit II a central maintenance workshop and store. In this latter spare and wearing parts can be manufactured and rolls novated and provided with scratches. Attached to the maintenance workshop are a machine shop equipped with 7 outdated machine tools, a locksmith's and welding shop, as well as a joinery and an electrician's workshop. There is also a car maintenance and service workshop that is better equipped than the above mentioned ones. There is also a spare parts store in which mainly materials needed for the cars are stored. The number of persons engaged in maintenance work is 50 to 60.

b/ Adequacy of maintenance and repair facilities

The maintenance and repair facilities can be considered as unsatisfactory (see also Table 4.), resulted from the unfavourable conditions and partly outdated machines.

c/ Recommendations for improvement

Development of existing repair shop, replacing the outdated machines
Organizing of systematic and planned, preventive maintenance and suitable storage system
Training of skilled personnel

61.22 SEMPAC, engineering school, Blida

General description

The school in which 18 persons are trained is under the supervision of the society of milling industry and farinaceous food-stuffs making SEMPAC. The training time is 2 years and the students are wanted to have a secondary-school leaving certificate. The school is supported by Switzerland and the director and in the same person the professional leader of the school are delegated from the same country.

Both the programme of studies and the equipment of the school are of high level and the laboratory is up-to-date. As training shop mill unit II is used where there are also up-to-date machines mainly for the purposes of practical training.

After finishing the students of the school are sent for further training Braunschweig or Sankt Gallen, from where they returns after one year as milling engineers.

Description of repair and maintenance

Concerning the maintenance it's served by SEMPAC mills, farinaceous food-stuffs and children-food factory.

61.23 Society of tobacco and match making industry SNTA

General description

The society is subordinated to the direction of food industry-branch of the ministry of industry and energy.

Range of production: tobacco preparing, match making. The centre controls 12 factories, that prepare 8200 tons of tobacco annually and cover the whole match demand of the country.

Total number of employees: approx. 3200.

The modernization of the factories and the extension of the production of the filter tipped cigarettes are planned. The machines are of different provenance, and come in general from Western countries. 30 percent of the machines are maximum 5 years old while the age of the rest ranges from 10 to 15 years.

An annual sum of 4 million DA is spent on the modernization of the machines and factories.

On the basis of the negotiations held in the centre and of the visit to the pertaining two factories it could be definitively established, that the organization of the production process and maintenance is satisfactory and under Algerian conditions exemplary (see also descriptions 61.24-25).

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

Maintenance work is organized in all factories and these sections co-operate in the machine work and spare parts production. The spare parts are stored in a central store.

In the factories there is a systematic preventive maintenance. Approximately 10 percent of the total staff is engaged in maintenance work.

b/ Adequacy of maintenance and repair facilities

The maintenance and repair facilities are on high level and can be considered as satisfactory (see also Table 4.).

c/ Recommendations for improvement

Due to the good conditions it's nothing important to be recommended.

61.24 SNTA, match factory, Algiers

General description

The factory pertains to the society of tobacco and match making industry SNTA.

Products: matches (satisfaction of home demands).
Number of staff: 500.

The majority of the machines were imported from France and the rest from Germany. The average age of the machines ranges from 10 to 15 years. The machines are maintained correctly. The factory is orderly and well organized. The leaders of the productive and maintenance shops are French specialists. The technological process is completely mechanized. 50 percent of the machines and equipment are automatic and 50 percent semi-automatic.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

The maintenance is systematic and preventive. The factory is stopped for half a day every week. During this time the machines are inspected and repaired and measures are taken to prevent imminent faults. If necessary the machines are removed from the production process and replaced by a reserve machine or the way of the material flow is changed.

Once a year the factory is stopped for one month. In this period the necessary overhauls are performed. The required annual quantity of spare parts is ordered from abroad or from the own machine shop on the basis of a detailed inspection of the machines. Except for the granting of the foreign currency and the export licence no special difficulties are encountered in the purchase of the spare parts from abroad.

The maintenance and tool shop is equipped with 9 universal machine tools. These are also used to make complicated workpieces. The tooling and instrumentation are up-to-date and perfect. The number of staff of the maintenance and tool shop is 40. The training of the workers is satisfactory. There is a well equipped spare parts store with systematic and easy to survey registration of the stock.

b/ Adequacy of maintenance and repair facilities

The maintenance and repair facilities can be considered as satisfactory (see also Table 4.).

c/ Recommendations for improvement

Due to the good conditions it's nothing important to be recommended.

61.25 Cigarette factory SNTA, Algiers

General description

The factory pertains to the society of the tobacco and match making industry SNTA.

The products are cigarettes. Capacity: preparing of 2000 tons of tobacco per year.

Number of staff of the factory: 700.

The machines were imported from France and Germany. 30 percent of the machines are maximum 5 years old.

70 percent of the machines on which filter tipped cigarettes are made are aged between 10 and 15 years. The plant is orderly and well organized. The technical leaders, the leaders of the designing section and of the maintenance shop are French specialists.

90 percent of the technological process is mechanized. 70 percent of the machines are automatics and 30 percent semi-automatics.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

The situation and system of maintenance is similar to those described with the SNTA match factory (see description 61.24). The number of staff of the maintenance shop is 70.

Occasionally also simple auxiliary machines (e.g. semi-automatic packing machines) are made in the maintenance shop. Owing to its relatively large capacity the shop serves also the remaining ten factories (with the exception of the match factory) pertaining to the society.

b/ Adequacy of maintenance and repair facilities

The maintenance and repair facilities can be considered as satisfactory (see also Table 4.).

c/ Recommendations for improvement

Due to the good conditions it's nothing inportant to be recommended.

61.26 Society of the tinned food industry SOALCO

General description

The society pertains to the direction of food industry-branch of the ministry of industry and energy, and unites 70 percent of the industry-section (see also descriptions 61.27-28).

Production range: fruit and vegetable conserves (the tins are purchased).

The society has 12 factories with a permanent number of staff totalling approximately 1700 (in the season the total number exceeds 10 000).

It is planned to reconstruct some of the factories and establish further factories. Up to 1973 approximately 10 new factories are to be established. The machines of the various factories are very different and their age ranges from 1 to 2 and 30 to 50 years. The machines come generally from Western Europe. No uniformisation of the machinery is planned.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organisation and spare parts storage

The maintenance activity is not organized and takes place occasionally. It is a general practice to perform a partial repair of the machines before the canning season begins.

There is a plan to establish a central maintenance shop and store. At present this plan is partly under construction and partly designed. It is planned to organize the maintenance service in the individual factories simultaneously.

b/ Adequacy of maintenance and repair facilities

The maintenance and repair facilities can be considered as unsatisfactory (see also Table 4.).

c/ Recommendations for improvement

Organizing of systematic and planned, preventive maintenance and suitable storage system
Training of skilled personnel
Development of existing repair shops
The central maintenance shop - being under construction -can be recommended only for control and special works.

61.27 SOALCO, orange and tomato preparing factory, Boufarik

General description

The factory pertains to the society of tinned food industry SOALCO.

The main line of production is the preparation of orange oil. At present the season is gone and the factory is shut down. In the season 10 to 12 tons of raw material are processed every day.

The machines aged approximately 10 to 12 years were imported from France and Germany. The factory is moderately up-to-date and rather reasonably mechanized.

The constant number of staff is 10 to 12 persons. At present the worker come to the factory but do practically nothing.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

No maintenance work is done in the factory.

The maintenance activity is not organized.

b/ Adequacy of maintenance and repair facilities

Due to lack of maintenance activity it cannot be considered.

c/ Recommendations for improvement

Establishment of own repair shop
Organising of maintenance activity

61.28 SOALCO, central repairing shop

General description

The workshop pertains to the society of the tinned food industry SOALCO.

It is under construction. The designer and future leader of the workshop is a French engineer.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

There will be an electrician's a locksmith's and a machine shop, etc. as well as a central store for spare parts and secondary materials. The machines are purchased from Italy.

The capacity is planned low (3 to 4 universal machine tools and 15 to 20 skilled workers). 3 to 4 persons of this staff having a service car at their disposal can be sent to perform urgent repairs.

The skilled workers are trained within the plant. In this field there are no difficulties. Up to date the purchasing of spare parts was occasional.

The maintenance activity will be organized according to the plan in a similar way as in the other foodstuff factories.

b/ Adequacy of maintenance and repair facilities

The maintenence and repair facilities - according to presentation - can be considered as unsatisfactory (see also Table 4.).

c/ Recommendations for improvement

Organization of systematic and planned, preventive maintenance and suitable storage system
Control of factories-owned repair shops.

61.29 Society of cork industry SA Liege

General description

The syndicate unify 100 percent of the industry-section and pertains to the direction of food industry-branch of the ministry of industry and energy.

Products: various cork products, stoppers, expended cork, insulating plates, etc. The society has five factories and a transport section bringing the cork into the factories.

The number of employees is 1200.

The raw cork is processed mainly by hand. Mechanisation is confined to impregnation and shaping and the making of cork plates, but is of a very low level even in this field.

According to the information obtained, the modernization of the factories is planned or in process, respectively. In the frame of the modernization new technological processes will be introduced. This work is performed by French specialists.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

Owing to the large amount of manual work maintenance does not play an important role and accordingly it is of low level.

After the factories will be modernized, maintenance will be organized accordingly in order to ensure a trouble-free operation of the new machines.

b/ Adequacy of maintenance and repair facilities

The actual maintenance and repair facilities can be considered as unsatisfactory (see also Table 4.).

c/ Recommendations for improvement

Organizing of systematic and planned, preventive maintenance and suitable storage system.
Training of skilled personnel
Development of existing repair shop, as it is planned.

61.30 SA Boisson

General description

The enterprise representing 70 percent of the section is subordinated to the direction of the food industry-branch of the ministry of industry and energy.

Range of production:making fruit juices, Coca-Cola and pasteurizing of beer. Capacity: 1500 hectoliters/month.

Number of staff: 91.

The factory is moderately up-to-date. There are separate groups of machines for the production and bottling of soft drinks as well as for the pasteurization and bottling of beer. The factory has a suitable chemical laboratory and an inspection section.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

The maintenance work is organized under the given conditions, but the spare parts supply causes certain difficulties owing to the circumstance that certain machines are more than 10 years old and there is also a machine that was supplied as a prototype.

The manufacturing of the wearing parts of the automatic and semi-automatic machines is not ensured within the country.

b/ Adequacy of maintenance and repair facilities

The maintenance and repair facilities can be considered as unsatisfactory (see also Table 4.).

c/ Recommendation for improvement

Organizing of systematic and planned, preventive maintenance and suitable storage system.
Training of skilled personnel.
Development of existing repair shop.

61.31 Society of sugar industry, SOGEDIS

General description

The society unites 100 percent of the section of industry and is subordinated to the direction of the food industry-branch of the ministry of industry and energy.

The products are: raw and refined sugar.

The society has three factories, of which two were put into service in 1966. The third factory was established earlier. This latter has no refinery so that the raw product of this factory is refined in the two other ones.

The total number of employees in the three factories is approximately 250 to 300 (permanent). In the season this number is considerably higher.

In 1969 a new sugar factory of high capacity will be put into operation, that will be produce in this year a daily quantity of 1500 tons of raw sugar and 330 tons of refined sugar. The planned number of staff is 300.

The new plants were designed by French specialists and are equipped with French machines. The production is up-to-date and well organized. The spare parts are supplied by the makers of the machines and up to this time no difficulties were encountered in this field. The production is directed generally by French specialists.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organisation and spare parts storage

The factories have their own well equipped repair shops. Mainte-

nance activity and storage of spare parts are systematic and on high level.

b/ Adequacy of maintenance and repair facilities

The maintenance and repair facilities can be considered as satisfactory (see also Table 4.).

c/ Recommendations for improvement

Due to the good conditions it's nothing important to be recommended.

61.32 Society of oil industry SONATRAC

General description

The society is controlled by the ministry of industry and energy.

The scope of the society's activity covers the whole field of oil production, including the research, drilling, transport, refining, etc. Investments are performed by the investment enterprise of the society.

Apart from some general information it was not possible to obtain detailed data and the Team was not permitted to visit the plants pertaining to the society.

According to informations obtained from different sources in this branch of industry there are considerable French and recently American interests and the various activities are directed by specialists coming from these countries. The plants of the branch are, according to the information obtained, generally new and up-to-date.

The oil production is one of the most important factors in the economic life of the country, it takes a great share in the national income and a considerable amount of the products is exported.

In the oil industry new important investments are planned and in process, respectively. Thus in Arzew a distilling and a refinery plant that required an investment of 250 million DA will be put into operation within half a year.

A study plan is being elaborated at present for the establishment of a plant of similar size. This plant will be established in Skikda.

Description of repair and maintenance

The Team got only general informations. According to these maintenance and spare parts supply are organized well and satisfactory, so that in this field there are no difficulties and no problems to be solved.

61.33 Office National du Matériel Agricole, ONAMA

General description

The ONAMA is a trust-like organ that control the maintenance of the agricultural machines. It is subordinated to the Direction des Approvisionnements in the ministry of agriculture and agrar-reform.

In the country there are approximately 20 000 tractors of various kinds and 2 000 other agricultural machines of larger capacity such as threashing machines, harvesting-threshing combines, etc. In addition to these there is a great number of simple agricultural machines, such as ploughs, harrows, seeding machines, sprayers etc. The machines come from various countries and the majority of these is outdated and needs to be replaced.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

The enterprises pertaining to this organ and their organization is as follows (see also descriptions 61.34-36):

14 central machine repairing factories (UMA) located in each department of the country and having a number of staff ranging from 30 to 200.

15 central machine repairing factories (CMA) located generally in each department of the country. The difference in the denomination is the result of the circumstance that these factories had earlier a co-operative character and served the agricultural co-operatives.

82 district repairing shops (CAP). The number of staff in these shops is 25 on average. These are in general low-level workshops that are only equipped for minor repairs.

All agricultural machines of the country are maintained and repaired in the factories and shops subordinated to the ONAMA. One part of the machines are the property of ONAMA or of the units subordinated to it and lended to the agricultural units.

b/ Adequacy of maintenance and repair facilities

The maintenance and repair facilities of the central repairing factories can be considered as satisfactory, that of the district repairing shops as unsatisfactory (see also Table 6.).

c/ Recommendations for improvement

Utilization of the total capacity of the existing central repairing factories (see explained also under 42.2 and 45.8).

61.34 Central repairing factory UMA, Birkadem

General description

The factory is under the supervision of the ONAMA. Annually 300 to 350 tractors are overhauled and in addition approximately 200 to 300 other machines (e.g. pumps and simpler agricultural machines) are repaired.

The factory was designed in the Soviet Union and the equipment was supplied by Soviet enterprises. The factory employes Soviet co-operators.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

The factory consists of the following main units: machine shop, heat treatment shop, forgery, painting shop, and assembly shop. The machine shop is equipped with approximately 20 different machine-tools the age of which is maximum 5 years. The workshop is also equipped for the repair of engines and electric motors. The brake benches and instruments necessary for the tests are available.

The number of staff is 110.

The staff number of the plant includes the inspectors who inspect the machines used in the various agricultural units. The task of these inspectors is to inspect the machines for serviceability and to take decisions as to the place and mode of repair of the defective machines.

The capacity of the factory is not fully utilized, although the equipment would allow the performance of a larger amount of repair work and the manufacturing of spare parts. According to the information

obtained, in the future the capacity will be utilized to a still smaller degree since the work and the majority of the equipment will be decentralized. This trend cannot be considered as being correct, since the district repairing shops (CAP) are not even capable of performing their present tasks satisfactorily and the decentralization of repair work would make lower the level of maintenance work.

The number of skilled workers harmonizes with the present load, but in case the capacity would be fully utilized the acquirement of the necessary number of skilled workers would encounter difficulties.

b/ Adequacy of maintenance and repair facilities

The maintenance and repair facilities can be considered as satisfactory (see also Table 6.).

c/ Recommendations for improvement

Utilization of the total capacity
Extending of training facilities
Due to the good conditions it's not other important to be recommended.

61.35 District repairing shop CAP, Boukadra

General description

The district repairing shop working under the supervision of the ONAMA is located in the centre of a self-directing agricultural unit (Autogere) and repairs the machines of the same. Larger repairs that cannot be performed in this shop are carried out in the central factories UMA, CMA. The respective decisions are made by inspectors of the UMA.

The tractors seen in the workshop are of very different provenience, there were French, American, British, Yugoslav makes as well as French tractors assembled in Algeria, etc. The tractors are generally older than 5 years.

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

Concerning the amount of the work done no information could be obtained. The spare parts storage and supply are very primitive, and practically do not exist at all.

The number of staff is 22. The training of the workers does not attain the required level.

The equipment of the shop is outdated. The average age of the machines ranges from 35 to 40 years. The machinery consists of 6 obsolete lathes, 1 boring and 1 riveting machine.

The quality of the repair work and the productivity are extraordinarily low. In the shop there were 30 to 40 unserviceable tractors and 2 harvesting threshing combines waiting for being repaired, but repair work was not started with at all although the tractors will be needed in the next future. One part of the machines will not be, in all probability, serviceable at the beginning

of the agricultural season, while the rest will become soon unserviceable again owing to the low level of repair work.

b/ Adequacy of maintenance and repair facilities

The maintenance and repair facilities can be considered as unsatisfactory (see also Table 6.).

c/ Recommendations for improvement

Major repair works or overhauls should be made in the central repairing factories because they have suitable equipment and personnel

Training of skilled personnel

Amelioration of equipments level

61.36 District repairing shop CAP, Moretti

General description

The district repairing shop is, like the shop of Boukadra controlled by the ONAMA and repairs the machines of a self-directing agricultural unit (Autogere) in the centre of which it is situated.

In this agricultural unit there are winelands cultivated with machines, but also vegetables and cereals are grown. The machines are, in accordance with the mode of cultivation, smaller tractors and in general simple machines (sprayers, powdering machines, etc.).

Description of repair and maintenance

a/ Existing repair facilities, maintenance organization and spare parts storage

The average age of the machines ranges from 5 to 15 years, and they are rather work down.

The number of staff is 25 and the level of the training of the workers is low.

The conditions existing in the shop are similar to those in the shop of Boukadra (see description 61.35).

b/ Adequacy of maintenance and repair facilities

The maintenance and repair facilities can be considered as unsatisfactory (see also Table 6.).

c/ Recommendations for improvement

Recommendations are the same as under 61.35.

61.37 Ministere de l'Education National, Organization Department

It is the first grade and the university education that is under the direct control of the ministry.

The secondary schools are controlled by the various ministries and the ministry of education has only the right of supervision. Accordingly the programme of studies in the professional schools and secondary technical schools (moyens cadres) as well as in the schools in which the skilled workers (ouvriers qualifiés) and the foremen are trained are different according to the conceptions of the various ministries.

Some schools are directly subordinated to the ministry of industry and energy. Such are

the Ecole technique des Mines de Miliana,
the Ecole technique de l'EGA and
the Institut des mines et de la métallurgie de Annaba.

Other schools are maintained by the industrial societies (SONAREM, SONACOM, SEMPAC, etc.).

Approximately 50 percent of the population are educated.

A systematic campaign is carried on to fight analphabetism mainly among the industrial and agricultural workers. In the frame of this campaign approximately 100 000 workers and their peoples are trained annually with the assistance of the UNDP and the UNESCO.

The number of pupils and students, respectively is 1 500 000 in the first grade schools, 150 000 in the secondary schools and 10 000 at colleges and universities. The annual number of college and university graduates is approximately 1200, of which 70 are engineers.

In the various secondary and engineering schools subordinated to the ministry of industry and energy approximately 500 technicians and 200 engineers absolve every year. The peoples absolved the engineering schools are often sent abroad for further education and these return as university graduates.

Consequently more than 70 engineers graduate every year at home and abroad, but their exact number was not available.

No information was obtained as to the number and training level of the skilled workers. The training level varies with the authorities controlling the given branches. In the Team's opinion foreign assistance is necessary in all fields and categories of education if a satisfactory amount and quality of training is wanted to be attained.

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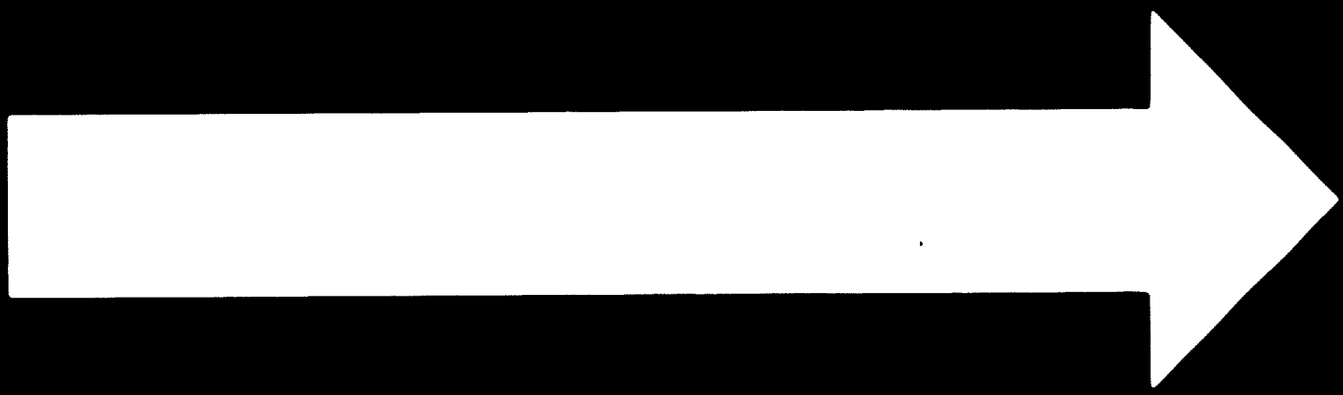

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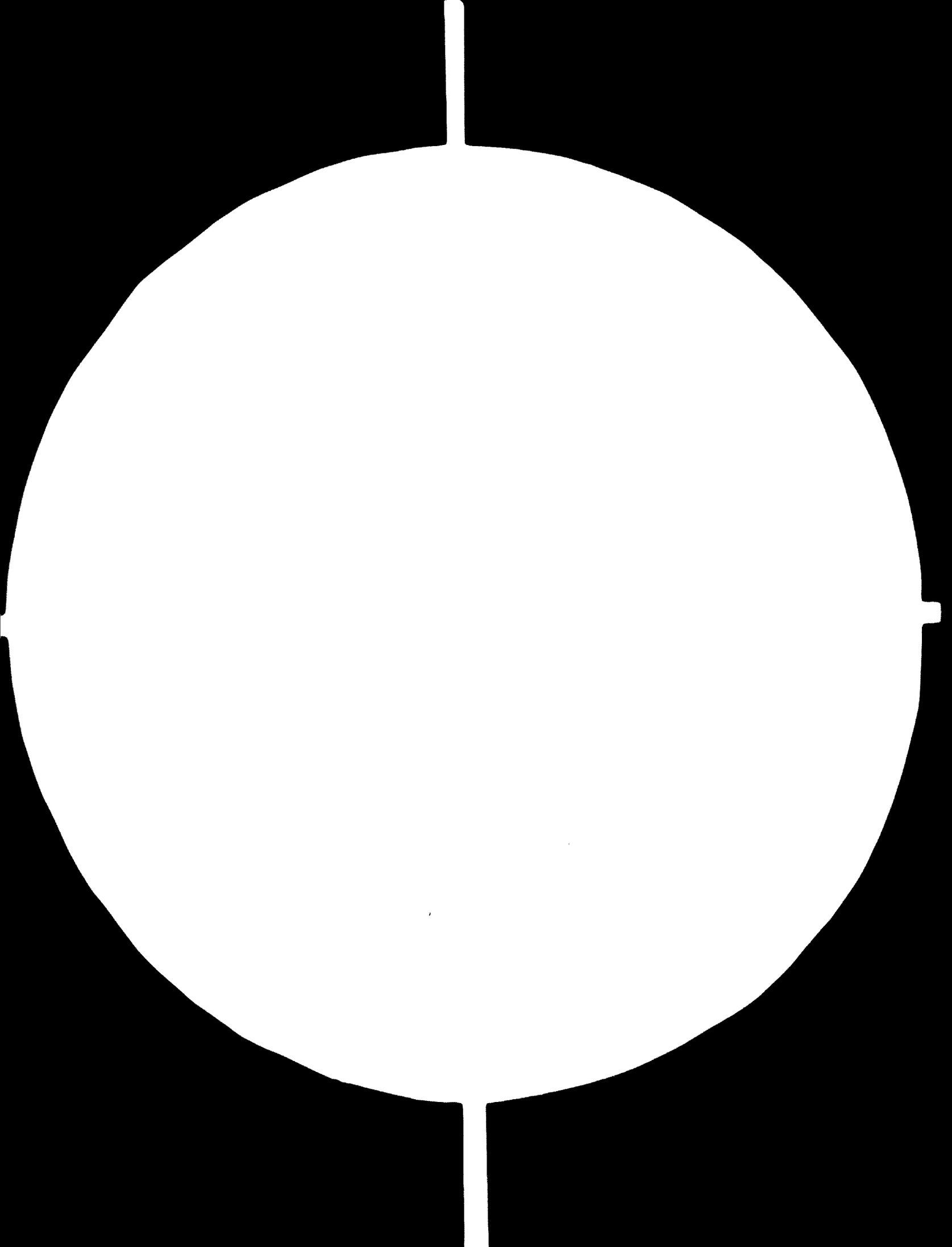

62.01 List of industrial activity displaying and that of the surveyed fac

Branch	Section	Number of factories	Number of surveyed factories
1	2	3	4
Metallurgical and mechanical industry	Metallurgical industry	2	2
	Mechanical industry	72	7
Building material industry	Cement-making	2	1
	Brick- and tile-making	x	2
	Paper-, glass-making	x	-
Chemical, textile and leather industry		x	-
Mining industry		about 28	2
Food industry	Vegetable oil making	9	2
	Milling industry and food-stuffs producing	90	4
	Tobacco-and match-making	12	2
	Tinned food industry	17	2
	Cork industry	5	1
	Non-alcoholic drinks-making	2	1
	Alcoholic drinks-making	x	-
	Sugar industry	3	-
Oil industry		x	-
Industry of energy		x	-
Mining and manufacturing industry total		1413	26
Repairing of agricultural machines	Central factories	29	1
	District shops	82	2
Repairing of agricultural machines	Total	111	3
Factories shops	Total	1524	29
Of them in the surveyed sections total		353	29

Remark: x There are no data

SECTION 1

uying and that of the surveyed factories

Table 1.

Number of factories	Number of surveyed factories	Remarks	No. of description
3	4	5	6
2	2	The integrated metallurgy works of Annaba are under construction	61.01-02
72	7		61.01, 61.03-09
2	1		61.10-11
x	2	A lot of aged factories with low capacity	61.10
x	-	A lot of aged factories with low capacity	61.10
x	-		61.12
about 28	2		61.13-15
9	2		61.16-19
90	4	One of the surveyed factories is a training shop	61.16, 61.20-22
12	2		61.16, 61.23-25
17	2		61.16, 61.26-28
5	1		61.16, 61.29
2	1		61.16, 61.30
x	-		61.16
3	-	One of the factories is under construction	61.16, 61.31
x	-		61.32
x	-		-
1413	26	Number of the factories by the data of of the Statistical Direction	
29	1		61.33-34
82	2		61.33, 61.35-36
111	3		
1524	29	Percentage of the surveyed factories: 1,9 %	
353	29	Percentage of the surveyed factories: 8,2 %	

SECTION 2

62.02 Volume and composition of foreign trade Table 2.

Export in 1963 3 477 million DA
Import in 1963 2 887 million DA

The balance is consequently active

Export		Import	
Goods	%	Goods	%
Oil, natural gas	66	Machines, equipments, vehicles	50
Wine, fruits	27	Provision	25
Iron-ore	3	Raw materials	2o
Other	4	Other	5
Total	100	Total	100

If the import of spare parts would be 10 % of the value of imported machines, equipments and vehicles, so it would reach 5 % of the total import.

The value of fixed founds in the industry was in 1968 around 10 000 million DA, from this the estimated value of machinery and equipments may be about 5 000 million DA. The value of spare parts imported (except vehicles) reaches about 1.2 % of the value of fixed founds for machinery and equipments.

62,03 Characterisation of the surveyed sections factories of the mining and manufac

Branch	Section	Factory	Profile	Quantity of the annual production	Number of employees	De ei niz
1	2	3	4	5	6	
Metallurgical and mechanical industry	Metallurgical industry		Rolled steel, tube, concrete steel	1300 000 t rolled steel and tube 22 000 t concrete steel	4500	hig
		Acilor, Oran	Concrete steel	22 000 t concrete steel	405	hig
		Integrated metallurgy works of Annaba	Rolled steel, tube	1300 000 t rolled steel and tube	4000	hig
	Mechanical industry		Different machines, steel constructions, castings etc.		11000	me an
		SN Métal, Unité d'Alte-lick, Annaba	Waggon, transporter	300 new waggons, 600 waggon repairing	600	low
		SN Métal, Unité d'Annaba	Steel construction, tank	12 000 t	390	hig
		SN Métal, Unité Cote Rouge	Heavy machines, crane, steel construction	4-5000 t	300	me
		CABLAF, Alger	Wire, cable	3600-3800 t	205	me
		LATRAF, Alger	Isolation of wires and cables	2200 t	150	low
		Union Industrielle Africain S.A. Alger	Iron and metal-casting, steel construction	4000 t iron- and 100 t metal-casting	300	low
		Société Nouvelle des Ateliers et Fonderies C.Ducros, Oran	Different machines, steel construction, casting etc.	600 t steel construction, 600 t steel-, 1800 t iron casting	260	me

SECTION 1

:tories of the mining and manufacturing industry

Table 3.

Quantity of the annual production	Number of employees	Degree of mechanization	Organization	Remarks	No. of description
5	6	7	8	9	10
1300 000 t rolled steel and tube 22 000 t concrete steel	4500	high	factories: satisfactory society: now organized	4000 employees of the total will be in the integrated metallurgy works of Annaba	61.01
22 000 t concrete steel	405	high	satisfactory	Capacity: max. 30 thousand t	61.02
1300 000 t rolled steel and tube	4000	high	satisfactory	Provided starting 1969	61.01
	11000	medium and low	factories: acceptable society: unsatisfactory		61.01
300 new waggons, 600 waggon repairing	600	low	unsatisfactory		61.03
12 000 t	390	high	satisfactory	160 employees of the total in construction	61.04
, 4-5000 t	300	medium	satisfactory		61.05
3600-3800 t	205	medium	acceptable		61.06
2200 t	150	low	unsatisfactory		61.07
4000 t iron- and 100 t metal-casting	300	low	unsatisfactory		61.08
600 t steel construction, 600 t steel-, 1800 t iron casting	260	medium	satisfactory		61.09

SECTION 2

1	2	3	4	5	6
Building material industry			Cement, brick, tile, paper, glass	720 000 t cement 320 000 t brick	700
		Cimenterie, Pointe Pescade, Alger	Cement	500 000 t	18
		Briqueterie, Oran	Brick	+	+
		Briqueterie, Annaba	Brick	+	+
Chemical, textil and leather industry			Fertilizers, sulphuric acid, yarn, cloth, shoes etc.	100 000 t fertilizers, 48 000 t sulphuric acid, 4 800 t yarn, 6 300 000 m2 cloth, 1 800 000 pair shoes	16 00
Mining industry			Iron and metal ore, phosphate, barite, marble, bentonit	3000000 t iron ore, 120 000 t metal ore and concentrate, 85 000 t phosphate	600
		SONAREM, Mines Ouenza	Iron ore mining	1 500 000 t	180
		SONAREM, Mines Ouenza, installations portuaires, Annaba	Waggon repairing, transporter, ore loading	271 waggon repairing, 2 200 000 t ore loading	22
Food industry	Vegetable oil making		Vegetable oils	+	180
		SNCG, cooking oil refining factory, Alger	Cooking oil	+	+
		SNCG, central repairing shop, Alger	Repairing	+	7
	Milling industry and farinaceous food-stuff-making		Milling-products, farinaceous food-stuffs, children-foods	+	7000
		SEMPAC mills, farinaceous food-stuff and children-food factory, Blida	Meal, groats, farinaceous food-stuff, children-food	12 000 t food-stuff and children-food 30 000 t meal and groats	700
		SEMPAC engineering school, Blida	Meal, groats	+	24

SECTION 1

5	6	7	8	9	10
720 000 t cement 320 000 t brick	7000	except one cement factory, low	except one cement factory, unsatisfactory		61,10
500 000 t	186	high	satisfactory	Employees: included the personnel of the quarry	61,11
+	+	low	unsatisfactory		61,10
+	+	low	unsatisfactory		61,10
100 000 t fertilizers, 48 000 t sulphuric acid, 4 800 t yarn, 6 300 000 m2 cloth, 1 800 000 pair shoes	16 000	medium and low	acceptable and unsatisfactory	Degree of mechanization and organization according to informations	61,12
3000000 t iron ore, 120 000 t metal ore and concentrate, 85 000 t phosphate	6000	except one iron ore mine, low	except one iron ore mine, unsatisfactory		61,13
1 500 000 t	1800	high	satisfactory		61,14
271 waggon repairing. 2 200 000 t ore loading	220	shop: low loading: medium	unsatisfactory		61,15
+	1800	medium	acceptable		61,17
+	+	medium	acceptable		61,18
+	70	medium	acceptable	Under construction	61,19
+	7000	medium and low	acceptable		61,20
12 000 t food-stuff and children-food 30 000 t meal and groats	700	medium	satisfactory		61,21
+	24	high	satisfactory	Training shop	61,22

SECTION 2

1	2	3	4	5	6
	Tobacco and match-making		Tobacco, matches, cigarettes	8 200 t tobacco wares	3 20
		SNTA match factory, Alger	Matches	+	50
		SNTA cigarette factory, Alger	Cigarettes	2 000 t	70
	Tinned food industry		Fruit and vegetable conserves	+	1 70
		SOALCO, orange and tomato preparing factory, Boufarik	Orange and tomato purée	In the campaign 10-12 t per day	10-1
		SOALCO central repairing shop, Boufarik	Repairing	+	15-2
	Cork industry		Cork products	+	1 20
	Non-alcoholic drinks-making	SA Boisson, Alger	Juice, Coca-cola	18 000 hectoliter	91
	Sugar industry		Raw and refined sugar	+	250-300
Oil industry			Oil production, transport and refining	26,5 million t	8 500

General remarks

+ There are no data

Estimation of the degree of mechanization: High is the degree of mechanization, if th
mechanized, e.g. only mounting is hand-m
Medium is the degree of mechanization, i
partly mechanized.
Low is the degree of mechanization, if ne

Estimation is influenced by the modernity of the machine stock (technical level, age
Judgement of organization is based on survey of the factorial organization and on s
Judgements considered the mostly small-scale production circumstances.
The data concerning branches and sections are partly conclusions, coming from the
according to informations.

SECTION 1

5	6	7	8	9	10
3 200 t tobacco wares	3 200	high	satisfactory		61.23
+	500	high	satisfactory		61.24
2 000 t	700	high	satisfactory		61.25
+	1 700	high	satisfactory	The number of employees comprises only the permanent staff	61.26
In the campaign 10-12 t per day	10-12	high	satisfactory	The number of employees comprises only the permanent staff	61.27
+	15-20	low	acceptable	Under construction	61.28
+	1 200	low	unsatisfactory		61.29
18 000 hectoliter	91	medium	acceptable		61.30
+	250-300	high	satisfactory	The number of employees comprises only the permanent staff. Degree of mechanization and organization according to informations	61.31
26,5 million t	8 500	high	satisfactory	Degree of mechanization according to informations	61.32

egree of mechanization, if the production and materials handling are totally or mostly
e.g. only mounting is hand-made.
ne degree of mechanization, if the production and materials handling are only
nized.
egree of mechanization, if nearly the total production and materials handling are made by hand.
e stock (technical level, age etc.).
ctorial organization and on subjective estimation.
n circumstances.
conclusions, coming from the data of the surveyed factories, partly

SECTION 2

62.04 The situation on maintenance in the surveyed sections and factories of the min

Branch	Section	Factory	Number of employees in maintenance	Percentage of employees in maintenance related to the total	Level of personnel	Equipment of maintenance shop
1	2	3	4	5	6	7
Metallurgical and mechanical industry	Metallurgical industry		The working factory and this one under			
		Acilor, Oran	50	12,0	high	satis-factor
		Integrated metallurgy works of Annaba	+	+	high	satis-factor
	Mechanical industry		+	2,5-10,0	medium	accep
		SN Metal, Unité d'Allelick, Annaba	15	2,5	low	unsat factor
		SN Metal, Unité d'Annaba	15	4,0	high	satis-facto
		SN Metal, Unité Cote Rouge	12	4,0	high	accep
		CABLAF, Alger	10++	5,0++	medium	accep
		LATRAF, Alger	10++	6,0++	medium	[illegible] factory
		Union Industrielle Africain S.A., Alger	30	10,0	low	it's no shop
		Société Nouvelle des Ateliers et Fonderies C. Ducros, Oran	18	7,0	medium	satis-factory
Building material industry			+	+	low	unsatis factory
		Cimenterie, Pointe Pescade, Alger	70	38,0	high	satis-factor
		Briqueterie, Oran	+	+	low	unsatis factor
		Briqueterie, Annaba	+	+	low	unsatis factor
Chemical, textile and leather industry			+	+	low	accepta

SECTION 1

ctions and factories of the mining and manufacturing industry — Table 4.

Percentage of employees in maintenance related to the total	Level of personnel	Equipment of maintenance shop	Percentage of self-produced spare parts	Level of storing of spare parts	Quality of maintenance work	Organisational method of maintenance	No. of description
5	6	7	8	9	10	11	12
ing factory and this one under construction are not to be considered together							
12,0	high	satisfactory	60	high	satisfactory	repair yearly	61.02
+	high	satisfactory	80	high	satisfactory	planned preventive	61.01
2,5-10,0	medium	acceptable	0-50	medium	acceptable	repair yearly, emergency repair	61.01
2,5	low	unsatisfactory	insignificant	medium	unsatisfactory	repair yearly	61.03
4,0	high	satisfactory	15	high	satisfactory	regular	61.04
4,0	high	acceptable	+	medium	acceptable	repair yearly	61.05
5,0++	medium	acceptable	10++	medium	acceptable	emergency repair	61.06
6,0++	medium	unsatisfactory	insignificant	low	unsatisfactory	emergency repair	61.07
10,0	low	it's no shop	insignificant	low	unsatisfactory	repair yearly	61.08
7,0	medium	satisfactory	50	high	acceptable	planned, preventive	61.09
+	low	unsatisfactory	insignificant	low	unsatisfactory	emergency repair	61.10
38,0	high	satisfactory	15	high	satisfactory	planned preventive	61.11
+	low	unsatisfactory	ϕ	low	unsatisfactory	emergency repair	61.10
+	low	unsatisfactory	ϕ	low	unsatisfactory	emergency repair	61.10
+	low	acceptable	insignificant	medium	unsatisfactory	emergency repair	61.12

SECTION 2

1	2	3	4	5	6	
Mining industry			+	+	low	unsa facto
		SONAREM, Mines Ouenza	400	22,0	high	satis facto
		SONAREM, Mines Ouenza, Installations portuaires, Annaba	18	8,2	low	unsa facto
Food industry	Vegetable oil-making		370	20	medium	unsa facto
		SNCG, cooking-oil refining factory, Alger	+	+	low	unsa facto
		SNCG central repairing shop, Alger	70	-	medium	ccept
	Milling industry and farinaceous food-stuffs making		+	+	medium	unsa facto
		SEMPAC mills, farinaceous food-stuffs and children-food factory, Blida	50-60	7,0-8,0	medium	unsa facto
		SEMPAC engineering school, Blida	Concerning the maintenance it's servi children-food factory			
	Tobacco and match-making		32o	10,0	high	satis facto
		SNTA match factory, Alger	40	8,0	high	satis facto
		SNTA cigarette factory, Alger	70	10,0	high	satis facto
	Tinned food industry		+	+	low	unsa facto
		SOALCO, orange and tomato preparing factory Boufarik	There is not own maintenance. Repai			
		SOALCO central repairing shop, Boufarik	15-20	-	-	unsa facto
	Cork industry		+	+	low	unsa facto
	Non-alcoholic drinks-making	S.A. Boisson, Alger	5++	5	low	unsa facto
	Sugar industry		+	+	high	satis facto
Oil industry			+	+	high	satis facto

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5	6	7	8	9	10	11	12
+	low	unsatis-factory	insig-nificant	low	unsatis-factory	emergency repair	61.13
22,0	high	satis-factory	15^{++}	high	satis-factory	regular	61.14
8,2	low	unsatis-factory	insig-nificant	low	unsatis-factory	emergency repair	61.15
20	medium	unsatis-factory	insig-nificant	low	unsatis-factory	repair yearly	61.17
+	low	unsatis-factory	insig-nificant	low	unsatis-factory	emergency repair	61.18
-	medium	ccepteble	insig-nificant	medium	acceptale	repair yearly	61.19
+	medium	unsatis-factory	insig-nificant	medium	unsatis-factory	emergency repair	61.20
7,0-8,0	medium	unsatis-factory	10^{++}	low	unsatis-factory	emergency repair	61.21
ung the maintenance it's served by SEMPAC mills, farinaceous food-stuffs and -food factory							61.22
10,0	high	satis-factory	15^{++}	high	satis-factory	planned, preventive	61.23
8,0	high	satis-factory	10^{++}	high	satis-factory	planned, preventive	61.24
10,0	high	satis-factory	20^{++}	high	satis-factory	planned, preventive	61.25
+	low	unsatis-factory	insig-nificant	low	unsatis-factory	emergency repair	61.26
s not own maintenance. Repair-works are made by other unities							61.27
-	-	unsatis-factory	insig-nificant	-	-	emergency repair	61.28
+	low	unsatis-factory	insig-nificant	low	unsatis-factory	emergency repair	61.29
5	low	unsatis-factory	insig-nificant	low	unsatis-factory	emergency repair	61.30
+	high	satis-factory	insig-nificant	high	satis-factory	regular	61.31
+	high	satis-factory	ϕ	high	satis-factory	planned, preventive	61.32

SECTION 2

Remarks

+	There are no data
++	Estimated data
to 61.o1	Planned state, according to informations
to 61.08	The productive machine-workers number is included in the number of maintenanc
to 61.10	Data according to informations. They are of general validity, except the cement f ameliorate maintenance, a central factory for repairing and spare parts producin The data of brick factories partly according to informations.
to 61.11	The high number of maintenance-personnel is justified partly by the total mechan that the personnel of the central storage, which belonged organically to the main
to 61.13	Data according to informations. They are of general validity, except the iron-ore
to 61.15	The data concerne the maintenance of own equipments. 97 employees of the tota maintenance of 271 ore-transporting waggons.
to 61.17	Due to weak maintenance-work of the factories, they have founded a central repa which is under construction.
to 61.20	The society founded a central spare parts storage and there is also provided, a the establishing of a central repairing and maintenance shop.
to 61.26	Due to weak maintenance-work of the factories, they have provided the establish
to 61.29	The data according to informations.
to 61.31	The data according to informations.
to 61.32	The data according to informations.

The data conceming branches and sections are partly conclusions, coming from the data o level of personnel is based partly on classification of repairs being in process and finishe

Estimation of equipments of the repairing shop is based on the comparison of the necessar technical level, modernity, age etc.). According to these points classification is in three de

Estimation of the level of storing is based on the circumstances of storing, on the record s points classification is in three degrees: "high", "medium" and "low".

Quality of maintenance-work is estimated on base of the work-circumstances, of the classific working machines, observed from view-point of maintenance. In this relation the quality of m

satisfactory is the quality, when the machine remaines after repair equal to the

acceptable is the quality, when the machine-usefulness decreases slowly and

unsatisfactory is the quality, when the machine-usefulness decreases quickly.

Estimation of the organizational method of maintenance:

Planned preventive is the maintenance, if the machines are in predeterminated in medium and general repairs are also made in predeterminated intervals.

Regular is the maintenance, if at the service of machines (lubrication etc.) the

Repair yearly means by the maintenance, that the machines are repaired only repairs are suitable to the occasion, it means only at defect of the machines.

Emergency repair is the maintenance, if the repairs are made only at the defect

Estimation of the organizational method of maintenance is based partly on the presented dat

ded in the number of maintenance-workers
eral validity, except the cement factory of Alger. In order to
airing and spare parts producing is planned.
formations.
stified partly by the total mechanization and considerable automatisation, partly by the fact,
belonged organically to the maintenance, is included in it.
eral validity, except the iron-ore mine of Ouenza.
ments. 97 employees of the total personnel work on regular repairing and

ley have founded a central repairing shop and spare parts storage,

ge and there is also provided, appertaining to that,
nance shop.
hey have provided the establishment of a central repairing shop.

lusions, coming from the data of surveyed factories, partly according to informations. Estimation of the
rs being in process and finished, partly on informations.

the comparison of the necessary job and of the satisfying state of the available machinery (quantity,
ints classification is in three degrees: "satisfactory", "acceptable" and "unsatisfactory".

nces of storing, on the record system and on the systematic order of stockpiling. According to these
nd "low".

k-circumstances, of the classification of repairs being in process and finished and of the survey of
. In this relation the quality of maintenance is estimated as:
maines after repair equal to the original,
iness decreases slowly and
usefulness decreases quickly.

achines are in predeterminated intervals revised and the small,
redeterminated intervals.
machines (lubrication etc.) the functioning is observed and the defects are repaired.
e machines are repaired only during the long summer vacation, in the other time the
nly at defect of the machines.
airs are made only at the defect of the machines, e.g. a part of the machine is broken.

ased partly on the presented data (register, prescription etc.), partly on informations.

SECTION 2

62,05 Level of tractor demande in the agriculture Table 5.

Type of area	Volume of area million ha	Volume of area %
Total	238,2	100,0
Cultivated area	50,2	21,0
Tillage area	6,5	2,7
Wine-lands and fruit-bearings	0,6	0,3

State of tractor demande		Date 1961	Date 1968
Number of tractors	(pc.)	28 000	20 000
Tillage area per tractor	(ha)	234	325
Wine-lands and fruit-bearings per tractor	(ha)	25o	35o

If the further decrease of the tractor stock couldn't be cut off by supply of new engines or by increased maintenance of the existing ones, so the index will be 483 ha per tractor in 1972 and it is not very likely to succeed, according to the international norms, by this way.

62,06 The situation of the agricultural machine-repairing service, based on

Directing organ	Central repairing factory	District repairing shop	Number of employees	Level of personnel	Equipment of the unity
Office National du Material Agricole			about 3600	The very different unities are not	
	UMA, Birkadem		110	high	satisfactory
		CAP, Boukadra	22	low	unsatisfactory
		CAP, Moretti	25	low	unsatisfactory

Remarks:

According to informations the characteristics of these surveyed central repairi repairing shops are equal to the other unities.

The capacity - utilisation of the surveyed unities - which can be regarded as of the central repairing factories is about 60-70 %, while this one of the district 150-200 %. This difference exists none the less, that partly - as it's evident f quality of repairs are considerably better in the factories, partly the place and determined by the authorized inspectors of the factories.

-repairing service, based on the survey

Table 6.

vel of sonnel	Equipment of the unity	Production of spare parts	Level of storing spare parts	Quality of maintenance-work	No. of description
very different unities are not to be considered together					61.33
n	satisfactory	a small quantity	high	satisfactory	61.34
	unsatisfactory	there is no	low	unsatisfactory	61.35
	unsatisfactory	there is no	low	unsatisfactory	61.36

hese surveyed central repairing factories and district

- which can be regarded as typicals-shows, that the utilisation
, while this one of the district repairing shops is between
that partly - as it's evident from the table - the equipment and
actories, partly the place and way of repairs are theoretically
ctories.

SECTION 2

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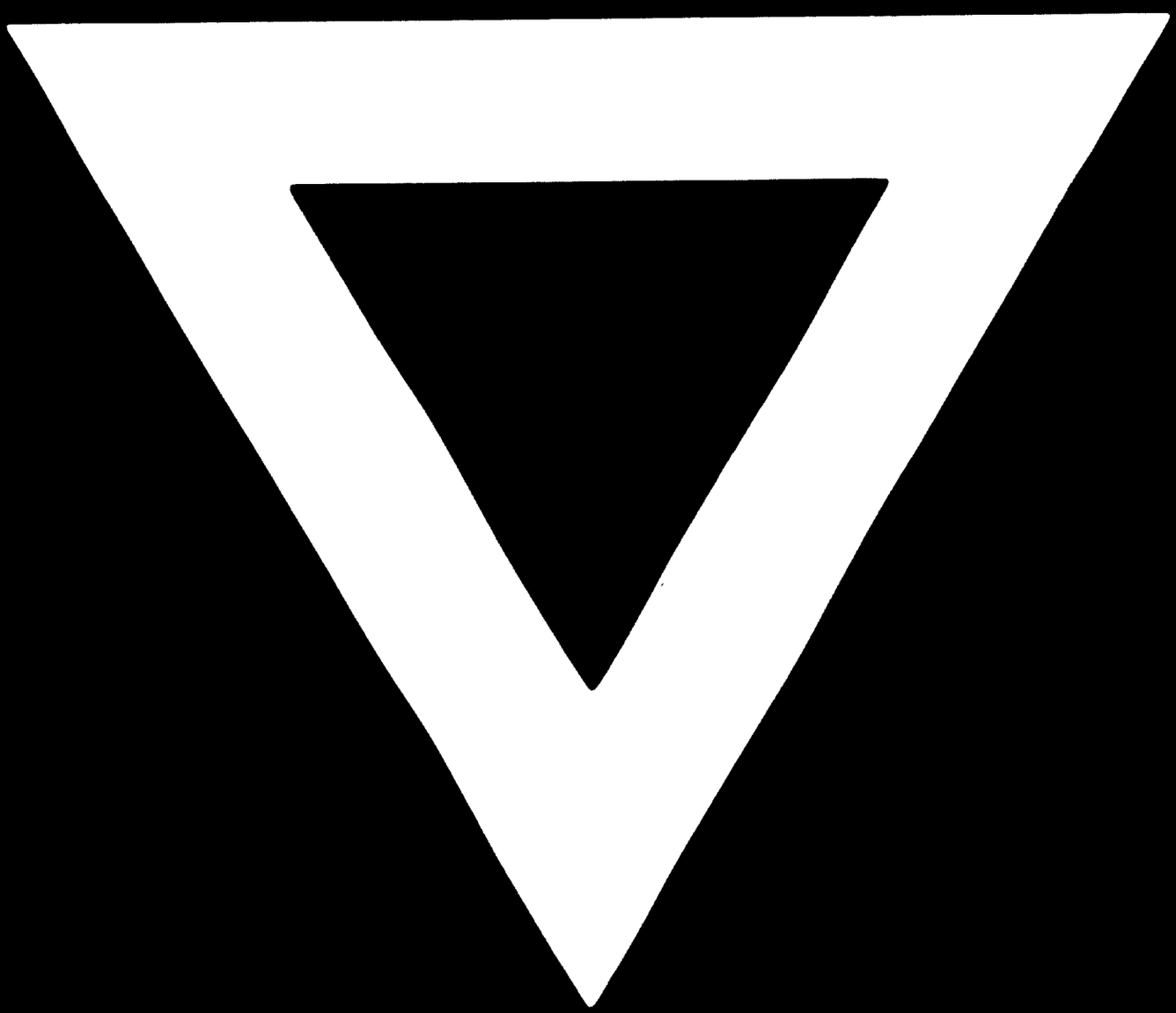

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