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TECHNICAL ASSISTANCE TO THE CEMENT COMPANY OF NORTHERN NIGERIA (CCNN) SOKOTO, NIGERIA

SF/NIR/86/001
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Report of the Evaluation Mission*

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
VIENNA

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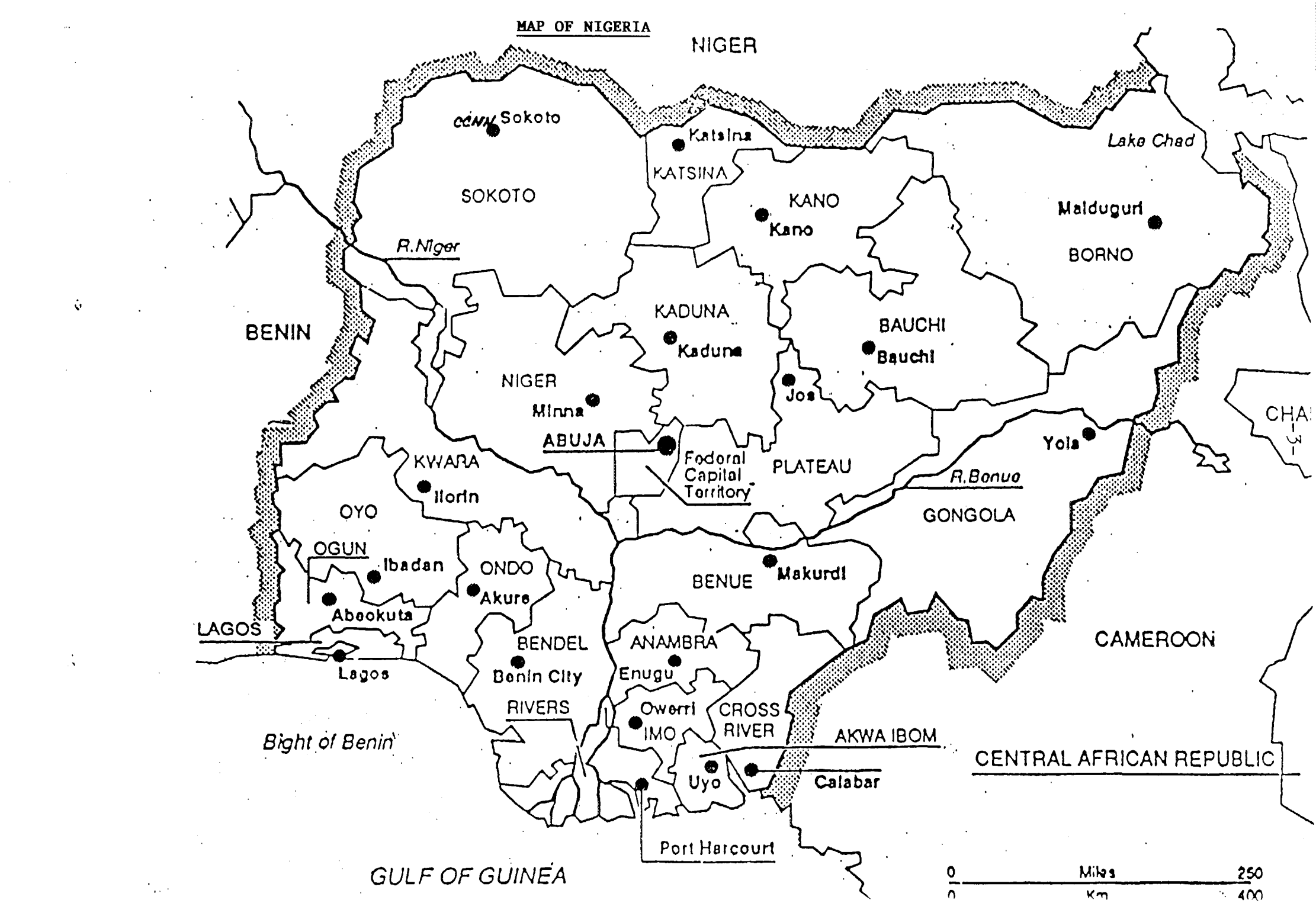
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Abbreviations, measurements, weights and currency

AG	Acting
AGM	Assistant General Manager
APO	Assistant Personnel Officer
BSO	Backstopping Officer
CCNN	Cement Company of Northern Nigeria
COY	Company
CME	Chief Mechanical Engineer
CEE	Chief Electrical Engineer
DGM	Deputy General Manager
Engr	Engineer
FMI	Federal Ministry of Industry
GNP	Gross National Product
HOD	Head of Department
IRSW	Industrial Relation and Social Welfare
JPO	Junior Personnel Officer
KCAL/kg	Kilo calories per kilogram
Km	Kilometer
m3	Cubic metre
Mw	Mega watt
MC/CD	Managing Director/Chief Executive
NNDC	New Nigerian Cement Company
PLC	Public Liability Company
PPER	Project Performance Evaluation Report
PM	Preventive Maintenance
tph	tons per hour
tpd	tons per day
tpy	tons per year
UAC	United African Company
UNIDO	United Nations Industrial Development Organization
UNDP	United Nations Development Programme
US	Dollar of the United States of America
WAPCO	West African Portland Cement Company
WNCD	Western Nigerian Development Co-operation
1 US	= 19.5 =N= (Nov. 1992)
1 =N=	= 0,5218 US

INTRODUCTION

The last PPER report made by CCNN requested for an in-depth evaluation to be carried out before the present technical assistance project expired. The project consists of two Phases with a total duration of 5,5 years. The first phase ran from June 1987 to June 1992, and the second phase from July to December 1992.

The in-depth evaluation was requested in order to assess the success/and or shortcomings of the project so far, as well as to suggest changes that would enhance the chances of achieving the objectives of the project.

The objectives of the project were as follows:

Development objective

To accelerate manpower development in the plant with the ultimate aim of technical self-sufficiency, and to improve performance as well as increase capacity utilization of the dry-process plant of CCNN, Sokoto.

Immediate objectives

To strengthen the capabilities of the national personnel in the operation and maintenance of the dry-process production line through the design and implementation of suitable training programmes.

Availability of adequately trained man power made up of 26 engineers and 59 skilled technicians.

Improved plant performance from 50% to 70% of the rated capacity of 500.000 tpy of clinker.

The Cement Company of Northern Nigerian PLC is situated approximately 1000 km north of Lagos in the north western part of Nigeria, 12 km outside Sokoto, the capital of the Sokoto State. The plant was originally planned in 1962 with capacity of 100.000 tpy. However, it was commissioned in 1967 only and had, subsequently, start-up problems and erratic electric power supplies as well as inadequate technical management. In 1975 a decision was taken to re-activate the cement plant to meet increasing national demand of cement. The Sokoto Cement Consortium (SCC) was established in 1977 to rehabilitate the existing facilities, consisting of overhauling the old equipment and constructing a new plant of an installed capacity of 500.000 tpy. bringing the whole plant to 600.000 tpy.

The old unit worked through the early eighties up to 1985 with very poor performance from the view point of capacity utilization and financial returns. The installation of the 500.000 tpy unit was carried out by the Ferrostahl AG company (W. Germany) and commissioned in the last part of 1985, while the old production line was completely shut down on the 25th. of September, 1985 for economic reasons.

Before the independence of Nigeria in 1960 effort was made to encourage various cement producers and manufacturers of cement making machinery from different parts of the world to forge joint ventures for establishing cement industries in various locations where the raw materials were available. These culminated in the establishment of Nigercem, Nkalagu, WAPCO, Evekoro, CCNN, Bendel Cement Coy, Benue Cement Coy, Ashaka Cement Coy and WAPCO Sagamu; see attached annex no. 3 for the complete list.

As of now seven of the above mentioned cement manufacturing companies with a total production capacity of 6,2 million tpy. still exist.

Unfortunately, the output of these plants is only about 3-4 million tpy, while the consumption in the country is 7-8 million tpy; see annex no. 3.

In an effort to enable CCNN to achieve the objective for which it was established, the New Nigerian Development Company (NNDC) approached UNIDO requesting for technical assistance to the existing production line as well as the new cement plant, in management, operation, maintenance and to improve capacity utilization.

The project concept foresaw significant activities, such as staff training within the plant to be carried out and it was implemented during the first phase of the agreement covering the period June 1987 to July 1990. The second phase, meant to consolidate the achievements of the first phase was originally planned to expire June in 1992, but was presumably extended to dec. 1992 awaiting the in-depth evaluation of the project, thereby facilitating decisions to be taken by management on the future of the plant.

The in-depth evaluation was carried out to comply with UNDP/UNIDO policy which requires that all projects of an international budget over US $ 1 million should be evaluated by an impartial body. The evaluation was suggested by CCNN to analyze the role the project had played. This meant:

a. assessing the achievements of the project against it's objectives and expected outputs, including re-examination of it's validity or otherwise.

b. identifying and assessing the factors that have facilitated the achievement of the project objectives as well as those factors which have supported the fulfillment or otherwise of those objectives.

The full terms of reference for this evaluation are contained in annex. no. 1. The evaluation was carried out to assist and form the basis for the TPR meeting held on 1.st. dec. 1992 in the board room of the CCNN plant.

The evaluation team consisted of the following:

Mr. Ole B. Gindrup (team leader)
consultant and representative of UNIDO

Mr. Dele Sowande (member)
Company Production and Development Manager,
WAPCO Plc. representing CCNN.

The mission took place in Sokoto from 14th november to 1st. december 1992. The team held meetings with the management of CCNN, UNDP/UNIDO representatives and FMI representative of the Nigerian government and had extensive discussions with the national staff as well as the UNIDO experts. The list of persons met is given in annex no. 2. Preliminary findings and recommendations of the evaluation mission were discussed with the MD/Chief executive of CCNN, FMI and UNPD/UNIDO, on 1st.december 1992.

A tripartite meeting was held after the in-depth evaluation in order to guide the parties involved in project implementation in taking decisions regarding its future.

The mission wishes to thank all members of CCNN staff, UNIDO experts, and particularly MD/chief executive Muhammed Rabiu Saidu, Deputy General Manager (operations) Engr. Jibril Usman and Systems Manager Jibril Layonu and his staff for their excellent, professional and administrative support to the evaluation team.

SUMMARY

I. PROJECT CONCEPT AND DESIGN

A. Socio-economic and institutional context of the project

The cement industry is a basic core industry the growth of which along with other infrastructural industries is vital for Nigeria's economic growth.

There are seven cement companies in Nigeria whose capacity utilization is just about 50% (1992 production year up to sept. was 51,6%). CCNN's contribution to Nigeria's total production of cement is about 8%

a. Employment structure

The present estimated staff strength in all cement companies in Nigeria is about 9000. Approximately 10% of this number are in the professional management grades. The rest is made up of foremen, clerical and other junior workers. The total number of expatriates is estimated at about 2% of the total workforce.

b. Sector priority

Due to the remote location of the CCNN plant and the long distances from other cement factories, it is expedient to optimize the production capacity to meet the ever increasing demand of cement in the sub-region of the north western part of Nigeria.

c. Development problems

There have been many problems militating against the optimization of full potential production capacity. There is a considerable lack of discipline, punctuality and dedication to work, which put together is a great constraint.

B. Project Document

I Analysis of objectives and outputs:

To strengthen manpower development with the aim of attaining self-sufficiency and optimization of capacity utilization. It is commendable that during the first 3 years, the project created a national management team of engineers and technicians, who will take over management from the UNIDO experts, who since october 1989 have worked in a supervisory position. The next two years consolidated the national counterparts experience to some extent, but it is also the opinion of the mission that there will still be some need for a reduced number of highly qualified technical assistants for some time to come.

Training programmes

The mission found out that extensive and detailed training programmes were organized at the beginning of the first phase, but it is also the impression of the mission that a great part of the education programme merely existed on paper whereas proper formalized training was not carried out in practice. One good reason for this could be inadequate class-room facilities and the location of same. A staff member is quoted as saying: "training consisted mostly of ad hoc efforts through the enthusiasm of some Nigerians who were in rapport with the UNIDO experts".

Examination of the production curve for clinker from 1988 to 1991, shown in annex no. 6, shows that there is a continuously increasing productivity which might have continued in 1992, had it not been for shortage of fuel oil compounded by a strike. A conclusion can be drawn that the

project has had an effect towards strengthening the capacity of the CCNN personnel to manage, operate and maintain the plant.

II. PROJECT IMPLEMENTATION

The project was initially budgeted at US $ 4.780.578 and the budget was increased, in order to accommodate the second phase, by an amount of US $ 1.201.642, for a total budget of $5.982.220.

It is the impression of the mission that the objectives of the first phase were not totally achieved. Consequently, the need to extend the project with the second phase, which was scheduled to last another 18 months, for the purpose of consolidating the achievements of the first phase was found necessary. Eventually the second phase was extended by six months, ending 31.st december 1992.

III. PROJECT RESULTS AND ACHIEVEMENTS OF OBJECTIVES

The results and achievements have been discussed in more detail in the text of the report where the following points have been highlighted:

- Low capacity utilization due to faulty design and bottlenecks.
- Lack of sufficient quarry and transport equipment to cope with the production desired.
- Lack of spare parts and consumables.
- General lack of dedication to work on the part of the staff .

IV. CONCLUSION

It is beyond doubt that the implementation of this technical assistance project approved in 1987 was a must, taking into consideration the bad experience with kiln no. I during the years from 1967 to it's shut down in 1985.

The technical assistance team from the polish consulting firm consisted of 23 experts during the first phase of the project. The team was made up of engineers in control of management, shift engineers, foremen, burners, mechanics, craftsmen etc. all accompanied and co-operating with their Nigerian counterparts. The expert team withdrew from being in control, to an advisory position, on 1 October 1989. Nine months later, phase two of the project, was started with the number of UNIDO experts now reduced to 13, and a tendency towards a better co-operation between the Nigerians and the UNIDO experts could be noticed.

The mission learnt that there was a language barrier between the English speaking Nigerian nationals and the Polish experts, particularly during the first phase of the project.

The following might be related to language problems. The mission was told that during the first phase, there appeared to be a number of "so-called experts", who did not live up to expectations.

If technical assistance to CCNN has to continue in future in one way or the other, it is absolutely a must that all communication between the parties is made in good and comprehensible English for optimal benefits.

Training activities have been carried out and extensive programmes on paper have been elaborated. Out-of-plant institutions in Nigeria have been used and some international courses abroad have been attended, mostly by managerial staff but, it is the impression of the mission that

the greatest part of the training activities have taken place in the form of in-plant group training. It is not believed that normal formalized in-class-room training based on manufacturer's instructions has been carried out to a great extent.

In June 1988 a preventive maintenance (PM) section was formally established in order to organize mechanical engineering activities related to systemized inspections, condition monitoring, troubleshooting, requirements of spare parts and consumables etc. in order to reduce downtime and further damage of machinery.

But to the best knowledge of the mission obtained through interviews it has not been possible to detect whether the PM is operational. The mission is convinced that PM and planned maintenance are not practiced and it would be more appropriate to call the practice "break down maintenance", which is very costly and contributes to further and often extensive damage to equipment and consequently lead to higher unavailability.

The final conclusion is that CCNN will still require some highly qualified technical assistance in specific areas to consolidate the previous gains.

V. RECOMMENDATIONS

It is very essential to firmly deal with all problems of indiscipline, poor attitude to work as well as the generally low level of commitment to the objectives of the company on the part of all cadres of staff at CCNN.

The present procurement procedure for spare parts and new critical equipment is very cumbersome and leads to many delays to the detriment of productivity. The mission suggest that this area be looked into very seriously so as to allow the board of CCNN to concentrate on budget approvals rather than being involved in procurement actions, as is the case at present.

General procurement guidelines should be established to reduce the present very long delays in purchases entailing too much downtime of the plant due to lack of spare parts at the appropriate time.

It is the experience of most Nigerian cement factories where government, particularly state governments, unduly interfere with day-to day management of these plants, that they are not as productive as others with more liberal management expertise. The mission feels that the board of CCNN should learn from this experience to meet the designed and desired objectives.

Before the foreign exchange deregulation in Nigeria it was a known fact that availability of convertible currency was a great constraint to the purchase of the required spare parts and consumables. Since the deregulation however, difficulties in purchasing foreign currency have been reduced, provided there is a budget to finance it. The present situation should improve, provided that CCNN continue to produce profitably.

With reference to technical problems the mission recommends the following:

Envisaged increased production should start from the quarry. The mission is convinced that with the present conditions of the quarry, excavation and earth moving equipment as well as the number of transport dumpers, the quarry will not be able to cope with the targets of a normal utilization of the plant.

It is recommended that when new mobile equipment is procured, it should be of certain uniformity of brand in order to reduce costs of spare parts and maintenance.

The amount of money required to purchase the above mentioned new equipment, and to maintain the existing ones is substantial and justifies the construction of a well designed workshop, equipped with special tools.

At present there is no proper workshop for mobile equipment at the CCNN plant. Furthermore, the main workshop is only a shed (i.e. a 12x5 m cement floor with three bays for undercarriage inspection and a roof over it). 20 - 25 sq.m. of this shed is an office for 5 to 6 people as well as being a storeroom for all kinds of items. It is certainly not a workshop for expensive heavy equipment.

The condition of the so-called central compressor station is really critical. Only one out of three compressors is at present functioning. The mission was informed that plans are under way to purchase new compressors as soon as the board of CCNN gives the management the green light. The new compressor centre should be placed in a better, dustfree location. Stress should be laid on the importance of this purchase as being vital for the productivity of the plant.

As previously mentioned and well known by the staff since the inception of the plant, the situation of the satellite coolers of the kiln constitutes a serious bottleneck. An early solution to this problem is of imperative importance for optimization.

Another serious bottleneck is the store for spare parts. The present physical space constraints of the store could to some extent be solved by removing the old spare parts for production line no.I which are occupying one third of the total storeroom (at present the value of the spare parts is estimated by the store to be about =N= 10 million). It is suggested that until a final decision on the fate of production line no.I is taken, the parts could be stored in steel containers elsewhere.

The current stacking arrangement whereby items are mixed up on the racks and shelves, does not lend itself to easy sorting and retrieval. The store requires a total re-arrangement, making use of stores experts within the country, if available, to sort things out or to be included as a part of technical assistance in future, if so desired. Eventually, computer aided stores management could be an ideal solution if well coordinated with computer assisted procurement and maintenance procedures.

It may be worthwhile for the Cement Manufacturer's Association of Nigeria to establish a cement institute for general training of their members as most of the plants suffer from the same problems of low productivity as CCNN. Such a training institution would enable staff from different locations to learn from one another's problems and find possible solutions through their interaction. Likewise it could also lead to interchange and possible purchase of common spare parts, in order to reduce price.

As regards recruitment of new personnel and training of same it is recommended that the management works out a definite policy in order to employ more educated and skilled labours than at present. There will be a constant turn-over of staff of appr. 10-12% annually, which would enable CCNN over a relatively short time to establish a better workforce which, given the right professional training, adequate motivation and some incentives, will form the best basis for increased productivity.

At present a new administration building is being constructed. When the construction is finished and the management has moved from the old buildings, priority should be given to, the old administration building which should be converted into a modern training center with modern and adequate training facilities and infrastructure.

Finally, the mission recommends that technical assistance to CNN should be extended in order to consolidate the achievements attained so far and to promote full self-reliance and upgrading of the national staff.

The mission further recommends a reduced number of technical assistance experts (who in addition to their specialization should also have pedagogical abilities) as follows:

- 1 Training expert with an all overall experience in all aspects of production and maintenance issues and possessing a good command of English.

- 1 chief technical adviser with extensive experience in mechanical engineering and specialized in general and preventive maintenance, troubleshooting etc. functioning at the level of works manager.

- 1 production engineer, (chem.engr.) who should be an expert in production planning and quality control.

- 1 'Mobile Plant' engineer, who should be an expert in diesel engines

- 1 Stores expert (f. inst. Nigerian).

The job descriptions of the proposed experts are shown in annex no. 9.

It is proposed that the above mentioned experts should function as a short term team for instance on a one year contract, with the main aim that the next project should be to establish a permanent training department within CNN. The job descriptions of the experts are attached as Annex No.9.

The input should be:

a) Qualified personnel for training to be lead by the training expert in co-operation with the CCNN training manager.

b) A training center within the existing administration building which contains the necessary space for class rooms, office, library, service facilities and workshops.

c) The necessary stationery and training equipment.

The outputs should be:

a) An operational permanent training department within CCNN, consisting of a training manager and a group of training officers.

b) One operational training center containing the necessary class rooms, office, library, service facilities and workshops.

c) A training concept comprising basic training programmes and training methodologies prepared specifically for CCNN according to actual requirements covering, but not limited to, the following areas:

Mechanical maintenance.
- Preventive maintenance.
- Repair techniques.

Electrical maintenance.
- Preventive maintenance.
- Instrumentation and control systems.

Process.
- Kiln operation
- Grinding

and subject to extension to cover the following areas:

Cement plant operation.
- Materials management
- Spare pats management
- Waste management
- Health and safety

Pollution control.
- Dust precipitation systems.

d) Training Unit consisting of:
- One training manager
- An adequate number of training officers.

e) Junior engineers, foremen and supervisors trained

f) Through manpower development, to optimize plant performance, internal safety, health and environmental protection.

g) Introduction of procedures concerning measuring, monitoring, and reporting on the training activities and their influence on the performance and efficiency of the plant.

Process Optimization

During the initial stages, the main task of all the above mentioned experts will be to establish a permanent training institution at CCNN. It is expected that the staff and operational personnel will attain a much better technical understanding and enhance their skills and will, through this co-operation with the foreign experts, be able to optimize process capacity, energy consumption and environmental protection in each department.

I. PROJECT CONCEPT AND DESIGN

A. Socio-economic and institutional context of the project

1. The cement industry of Nigeria.

The cement industry is a basic core industry, the growth of which, along with other infrastructural industries is vital for Nigeria's economic growth.

At the initiative of the Nigerian government the first cement company was established in 1954 with a plant located in Nkalagu in the eastern part of Nigeria and was named Nigerian Cement Company (Nigercem). Shortly afterwards the Blue Circle Industries (BCI) of Great Britain in partnership with the United African Company (UAC) and the Western Nigerian Development Company (WNDC) formed the West African Cement Company (WAPCO). between 1963 and 64 three grinding/milling plants came on stream, two in Lagos and one in Koko.

In 1962 the Northern Nigerian government through NNDC commissioned the German firm Ferrostahl AG to install an integrated cement plant in Sokoto. This pattern continued with the establishment of Ashaka and Benue Cement Companies. By this time there were seven cement manufacturing companies in Nigeria as indicated in annex no. 3 but, unfortunately the industry has, generally spoken, suffered from very low capacity utilization. The highest percentage ever achieved by all the plants has never exceeded 57,2% of installed capacity. In the year of this report the percentage for the first 9 months has been 51,6% out of which CCNN's contribution has been 8,24% of the total production.

2. Employment structure

The employment structure in the cement sub-sector ranges from the professional grades - production, mechanical, electrical and process engineers - to the specialist grades- machinists, mechanics/welders, pipe fitters, burners/millers and the administrative staff and casual labour force.

The professional and specialist cadres form the core of the production, commercial, marketing and plant operations of a cement company. The growth of the cement sub-sector in Nigeria shows that all the firms in operation were set up with foreign technical partnership. These technical partners furnished the initial expertise required for operations. It followed therefore that the size of the expatriate personnel in most of the cement companies was considerably big. With the implementation of the Nigerian Enterprises Promotion Decree of 1972 and 1977 followed by determined efforts for the training of it's local human resources, the cement sub-sector has achieved a gradual but rapid process of Nigerianisation in it's management and professional cadres.

The present estimated staff strength in the seven companies within the cement sector is about 9.000. About 10% of this number are in the professional management grades. The rest is made up of foremen, clerical and other junior workers. The total number of expatriate staff in the sub-sector is estimated at about 2% of the total workforce. The prospect of the Nigerianisation of staff is bright. However, this process may not be total because of the provision of some partnership agreements which require the visible technical presence of their foreign partner in the factories.

3. Market analysis

Over the years, the market for cement in Nigeria has been characterized by persistent supply shortages. There are some identified factors which affect the demand for cement in Nigeria. These include the following:

a. The continued insufficient popularity of other building materials such as clay bricks as substitutes. Portland Cement which dominates the Nigerian market virtually has no substitute because of the nation's construction taste in favor of concrete. The unavailability of an acceptable substitute has made cement as a product virtually inelastic to price. The implication is that even with sharp price increases, the quantity bought by consumers changes very little.

b. Increase in the country's Gross Domestic Product (GDP) is a reflection of growth in the economy of the nation. Any substantial growth in the economy usually involves substantial building and construction activities. For instance the total value of building and construction activities in 1988, 1989 and 1990 was estimated at =N= 1.9, =N= 3,0 billion and =N= 4.56 billion respectively.

c. Cement is basically an intermediate product. Even within the building and construction sector there are certain demands to be met as follows:

   i) Demand arising from social and educational needs such as housing, schools, universities, hospitals and sport complexes.

   ii) Demand arising from agro-industrial activities, and construction of large industrial plants as for instance for cement, steel an iron etc.

   iii) Demand arising from basic civil engineering works such as dams, ports, roads and airports,

Local production of cement in Nigeria from 1981 to 1990 is shown in annex no. 4.

4. Sub-sector priority

Due to the remote location from other cement factories the CCNN plant has, it is necessary and urgent to optimize the capacity utilization to meet the ever increasing demand of cement in the sub-region of the north western part of Nigeria.

5. Development problems in the sub-sector

There has been many problems militating against the optimization of potential production capacity. Some of these problems could be traced to faulty technical agreement, lack of technical administration, and production expertise and inadequate production planning. On top of this is the unnecessary interference of shareholders (state government) in day-to-day management of the plant.

Additionally, the quality of staff recruited by the management, especially as regards the operatives is below average for a plant of this size and sophistication. Effectiveness of training activities in the case of the company's junior staff is limited by the low level of their education. The percentage of illiterate and semi-illiterate staff during the three years 1987, 88 and 89 is 48,9, 49,7 and 47,7%, respectively. This calls for the establishment of a rigorous employment strategy focused on significant reduction of the above numbers.

From our point of view there is a considerable lack of discipline, punctuality and dedication to work. These issues have not improved since the start of the project according to reports and interviews.

The present facilities for the training department in the plant are inadequate due to the poor location, inadequate training tools, workshops and back-up training staff in the department. It was learned during interviews and from reports that there have been approved budgets for the construction of a training center and workshops throughout the last two or three years but the construction has never been realized.

B. Project Document

1. Objectives, Outputs: and analysis

A. Development Objectives.

The development objective states: To accelerate manpower development with the ultimate aim of achieving technical self- sufficiency, and to improve performance as well as increased capacity utilization of the dry-process plant, CCNN, Sokoto.

B. Immediate objectives.

The project document appropriately identifies the immediate objectives which are stated as follows:

1. To strengthen the capabilities of the national personnel, operating and maintaining the dry-process production line of 500.000 tpy through designing and implementing suitable training programmes.

2. (3.1.)
Availability of adequately trained manpower, made up of 26 engineers and 59 skilled technicians.

2.1. (3.2.)

Improved plant performance from 50% of the rated capacity to 70% of the 500.000 tpy clinker production.

a. Although the immediate objectives statement is at appropriate level, it is rather difficult to assess a reasonable success of improved capacity utilization through the training programmes due to many constraints in different areas along the line of production such as inadequate supplies of spare parts, fuel oil, electric power, industrial unrest (strike), general indiscipline amongst staff and high turn-over of skilled staff amongst the trained operatives and technicians.

Further to the objective statement in relation to optimization of capacity utilization, it would have been appropriate to specify more detailed targets to be obtained within specific areas and periods of the project time such as: specific production per hour, per day, per month, per year of quarry, mills, kiln etc.

Likewise it would have been appropriate to define the UNIDO team's specific roles in the project being a technical assistance group taking full control of all operations during the first phase of the project, which happened from the beginning of the project until the last quarter of 1989. Consequently, the mission confronted with these facts had difficulties in evaluating project performance due to some disagreements between UNIDO technical advisers and the national staff. It is also reported that the UNIDO team went in more for managing the plant than for the advisory role. Likewise did the co-operation between CCNN's technical adviser and the technical assistance team suffer from disagreements as well.

b. The project concept foresaw significant training activities such as staff training within the plant to be carried out during the first phase so that the Nigerians could take over management control of operations relatively early and maintenance functions a little later, thereby leaving the UNIDO experts in supervisory functions only. Training requirements and programmes were elaborated at the beginning of the first phase.

However, the mission has the impression that training programmes were merely on paper without any formalized training activities. Training consisted mostly of ad hoc efforts through the enthusiasm of some Nigerians who were in rapport with the UNIDO experts. The reasons for this situation might be the following:

1. Class-rooms of very low standard and poor location as they are situated near satellite coolers of the rotary kiln, which create an immense noise and heat.

2. Great difficulties of communication in English between most of the UNIDO experts; one of them cannot at all express himself in English and this will hinder any meaningful training. Two or three of the experts could not speak english on arrival at site but, to their credit they started learning English and are now able to communicate to some extent.

c. Examination of the extent to which the outputs (3.1) of the project have contributed towards strengthening the capabilities of the CCNN personnel to manage, operate and maintain the production line no. II can be extracted from the productivity curve on the sheet of production summery analysis for the years 1983 to 1992 (June) in annex no. 6. Though, not very impressive the ageing of the machinery should also be taken into consideration, as well as serious spare parts situation combined with other constraints. The tendency towards reduced output as shown in the graph for the current year can be traced to two stoppages in January and may due to national shortage of fuel oil and about four weeks shut down due to industrial action (strike).

Due to the reasons outlined above the expectation of an improved targeted performance (3.2) from 50% to 70% of the rated capacity of 500.000 tpy clinker, was not achieved.

The output of the second phase, aiming at consolidation of previously gained experience and skill to achieve availability of adequately trained manpower made up of 26 engineers and 59 skilled technicians, who by end of second phase (extended from 18 to 24 months) must have gained considerably improved experience in operation and maintenance, was difficult to confirm because of a rather high rate of turn-over of skilled technicians and other constrains within the training department as previously mentioned in the text.

d. Reviewing the relevance of the approach taken regarding the re-activation of the 100.000 tpy production line no. I, which was commissioned in 1967 and rehabilitated in the late seventies in terms of economic and technical availability did not seem to have been sufficiently addressed in the execution of the first phase. The UNIDO experts were, in the opinion of the mission, principally occupied with the management of the second line of production. A highly powered technical committee which made up of CCNN management and the UNIDO experts revealed that the rather deplorable state of the obsolete machinery after prolonged stoppage, combined with the fact that the manufacturers of the said machinery no longer existed, led to a negative decision on the part of CCNN, towards reactivation of production line no. I, which had been shut down on 25 September 1985. The commissioning of the production line no. II started one week later, on the 1 October.

e. It is imperative to have a purposeful recruitment of qualified manpower backed up with adequate development of programmes for attracting and retaining the right quality of personnel. The high percentage of turn-over in personnel indicates that the management policy should be somewhat changed, for instance by incentives, housing, transport, compulsory employment contracts after passing certain training etc.

f. All issues relevant to manpower and skill requirements as well as human resources and management at the plant level cannot be overemphasized. The productivity and economic viability of the plant depend on the human factors and the complexity of the human nature. The human being is the prime mover of any enterprise, be it industrial or social. The level of performance or achievement of the objectives of productivity will be greatly dependent on the quality of the technical and managerial skill of a plant's personnel. Given the right professional training and development of the right attitude through adequate motivation of the workforce will form the greatest assets of the plant.

The use of relatively low skilled and of almost 50% of not trainable illiterate manpower, combined with a high level of indiscipline, poor attitude to work, unpunctuality, slow response to operational events, general state of laxity and apathy are not conducive elements to higher productivity achievements.

g. Point 4.07 on page 11 in the PPER, covering the period July 1988 to june 1989 describes the various parameters which are essentially required towards achieving the desired outputs and claims that they have been established according to the following wordings: "separate PM section has been set up as a part of the mechanical department to organize engineering activities related to inspection, troubleshooting, condition monitoring, spare parts and consumables control in order to reduce substantially equipment down time and improve on operating efficiency of the various machines. In addition the preventive maintenance section aims at keeping maintenance costs within minimum limits" and further repeated in the same document under schedules activities, point 2 in a more detailed version.

To the best knowledge of the mission, obtained through intensive interviews with the management staff, it has not been possible to trace any trace of a practiced preventive

maintenance system - apart from a performance report on the activities of the preventive maintenance section of August 1988. The mission is convinced that this would contribute immeasurably to the availability of the plant machinery as well as the mobile plant equipment (It is well known that break-down maintenance is very costly and contributes further to extensive damages to machinery) and consequently un-availability. This is being practiced at present and is one of the shortcomings of the project.

With reference to the "report on training programme for the period of UNIDO mission with CCNN LTD. Sokoto" prepared by Mr. Andrzej W. Zbroja and Mr. Musa A. Yaya in December 1987 the training needs of the CCNN staff was analyzed and a plan of action was developed with clear indication of the duration and techniques of the training and institutions to be involved etc. The result of the implementation of the training programme is shown in annex no. 8, where a graph of the activities covers the period of 1987 to 1990. This final report of the training activities of the first phase is also made by the UNIDO training expert Mr. Zbroja Andrezej.

While the report and records show the above impressive documentation for the first phase, interviews of staff across the plant revealed that actual training activities were implemented more during the second phase. This resulted in achievement of the objectives to some extent. Interviews of staff have given the impression that the training activities during the first phase were addressed more to the managerial staff by their attending a number of international courses, seminars and in-plant attachments to other cement factories in Nigeria and this has contributed well to the above said impact. Training activities for the lower level of staff seems not to have been so effective.

II. PROJECT IMPLEMENTATION

A. Delivery of inputs

1. Cement Company of Northern Nigeria

In the original budget the CCNN's contribution in 1987 was planned at US $ 4.780.578. The total budget in accordance with the latest second phase budget from july 1990 to june 1992 was estimated at US $ 5.982.220. Thus the original budget has increased by about 25%. It is not possible for the mission to go into a break-down of the allotments of the funds due to lack of knowledge of relevant data.

2. Government/CCCN inputs

i) The Government shall through CCNN, in accordance with the requirements of the UNIDO experts, provide local operation staff and arrange for timely availability of raw materials, utilities and other facilities. Regrettably however, some of the facilities like a training center and workshops are not adequate or do not exist, though this has had approved budgets through the last consecutive three years. As regards raw materials it should also be mentioned that the quarry is not able to cope with the rated capacity of the plant due to lack of mobile plant equipment.

ii) The Government/CCNN shall provide enough counterparts to work with the UNIDO experts as trainees enabling the experts to phase-out their technical assistance when and if it is considered appropriate and as planned.

In the beginning it seemed that recruitment of Nigerian counterparts was rather slow going but that through consistent effort, CCNN later speeded up the number of Nigerian counterparts to be trained.

The problem is mainly on the shop floor level whose personnel education level is low to nil which does not make staff easily trainable - if at all. The educational background of company workers should be raised by establishing a proper employment policy which could gradually replace the big number of illiterates (appr. 47%) as the annual turn-over percentage is about 12. when the oldest staff members will start to retire.

iii) Government/CCNN shall provide all UNIDO experts with proper housing, household utilities and transportation, which seems to be the case.

iv) Government/CCNN shall provide the UNIDO experts with adequate secretarial assistance. This does not seem to have been the case or has not been used by the experts, which the instructions and reports made by some of the experts demonstrate and which the mission had the opportunity to see. They did not bear the stamp of secretarial assistance.

B. Implementation of activities

The mission was provided with a useful summary of project implementation figures which gave a good indication of the nature of assistance provided and activities carried out under this project.

In the course of the first three years of the project the two main activities were technical assistance in operation and training, with the objective of development of manpower, improved performance control and increased capacity utilization.

It is the impression of the mission that these objectives were not completely achieved concluding the first phase and thus consequently resulted in the extension of the project with the second phase of 24 months from July 1990 for June 1992 for the purpose of consolidating the achievements gained during the first phase. Again an extension for another six months until 31 December 1992 took place, which increased the duration to 5 1/2 years.

An output of the second phase should have been the availability of adequate manpower made up of 26 engineers and 59 skilled technicians who by the end of the second phase should have gained considerable manpower, experience in operation and maintenance.

The mission feels that CCNN has benefitted from the consolidation of training and change of management (Oct 1, 1989) as reflected in the increase of capacity utilization and improved profit margin commencing in 1989 through 1990 and 1991 when the lst production output came to 53,1% of the rated capacity which is higher than the yearly average since commissioning, being 48,5%. The figures are shown below:

Year	clinker t.	capacity t.	Cap. util. %
1985	106.703	600.000	17,8
1986	285.931	500.000	57,2
1987	205.219	500.000	41,0
1988	189.832	500.000	38,0
1989	222.963	500.000	44,6
1990	239.521	500.000	47,9
1991	265.484	500.000	53,1
1992 (sept)	169.025	250.000	(60,1)

In performing the technical co-operation activities, the relationship between the national and the international staff was not cordial during the first phase of the project. This situation, which the mission learned through interviews with the persons involved, was probably due to differences in culture and educational background; a bossy attitude was used by some of the experts, creating

some sort of tension from time to time. Fortunately, the state of affairs has changed for the better, and a very cordial and friendly relationship has grown during the second phase.

In the performance of the activities the mission was told that during the first phase there appeared to be a number of "so-called experts" who exhibited lack of basic knowledge in their particular specialization, simply put: they were not qualified.

Another barrier, as previously mentioned was the limited knowledge of English on the part of the UNIDO experts. The mission's opinion is that UNIDO should have been more critical in the selection and recruitment of the experts provided by a Polish consultancy firm. Experts not speaking a single word of english make especially training activities almost impossible.

C. Management and backstopping monitoring

The monitoring system for a project of this magnitude does not seem to have been carried out properly and frequently enough. It consists of - as far as the mission can trace - only two project performance evaluation reports (PPER) covering two thirds of the first phase prepared by MD/chief executive of CCNN engr. B.A. Suleiman and countersigned by Chief Technical Adviser Mr. I.H. Kazmi. For two years of the second phase one PPER was produced by the newly appointed MD/chief executive engr. N.R. Saidu and countersigned by Dep. GWM (operations) J.A. Usman. It would probably be more convenient if the PPER's were prepared by an independent body for instance a Nigerian specialist.

III. PROJECT RESULTS AND ACHIEVEMENTS OF OBJECTIVES

A. Outputs

The evaluation mission will now be explicit in providing detailed explanation of the capabilities created or strengthened in the counterpart organization. By going through the production departments, comments will be made on the achievements gained and the problems in the different departments that the staff has to cope with. The evaluation team spent a full week of it's stay interviewing the management staff and heads of departments discussing the state of equipment and problems related to constraints of different nature and dimensions.

1. Quarry and transport of limestone.

The raw material reserves are located close to the factory area, approximately 1 km and surveys made have ascertained quantities of 22 million tons (1989) of good quality limestone ranging from a calcium-carbonate content of 68,9 to 86,8%. These reserves will cover a period of about 24 years of production at a rated output of 500.000 tpy.

Present equipment in the quarry is:

1 old (app.20 years) excavator
1 new excavator (1992)
6 dump trucks. 2 of 30 m^3 out of which one has been down for about 18 months due to lack of spare parts. Two of 18 m^3 which are very old but still in service and two of 12 m^3 likewise very old.
3 dozers which are not always available due to other general services in the plant.
1 new Terex loader.

It should be mentioned that if the kiln should operate to the installed capacity this quarry equipment will not be able to cope. It is absolutely necessary to increase the fleet of equipment.

The present quarry engineer has gained tremendous experience from his past in Australia and training courses abroad as well as in co-operation for one year with the UNIDO expert who has left. He and his assistant are in full control of the operations and co-operate effectively with the laboratory and the mobile plant department. They are likewise confident and in good control of all the staff in their department.

2. Crushing department.

The limestone to be crushed is of an adequate and comfortable nature and need only be ripped - it is so soft that no blastings needed - and therefore is easily crushed in the hammer mill. The rated capacity of the crusher is 550 tph. The actual average production is approximately 400 tph taken over the last three years and which is 73% of the rated capacity.

3. Sampling station and mixing bed.

The sampling station gives an average picture of the materials brought in from the quarry to give the laboratory analysis of the content of the mixing bed. This was originally designed for a rated capacity of 48.000 t, but was modified by the experts and the national staff at the interlocking system, which was not suitable as delivered from the manufacturer. The actual capacity of the mixing bed is now 40.000 t.

4. Raw mill.

The raw mill is designed for a rated capacity of 145 tph and has actually produced over the last three years an average of 128 tph. which is 88,3% of rated capacity. The greatest constraint or handicap is that the raw mill cannot produce without the kiln in operation.

5. Homogenizing and storage silo.

The homogenizing silo is rated for a capacity of 9000 t which should cater for about three days of consumption of the kiln but, it is actually very much reduced due to accumulated and compressed material in the storage section of the silo. Combined with this, the homogenizing effect which was claimed to be designed for 1:10 ratio (normal) is found to be only 1:2-3, thus in effect it is more a storage silo than a homogenizing silo. This reflects from time to time in high fluctuations of carbonate percentage in the kiln feed, which again affects in the quality of the clinker and consequently in the final product: cement.

It should likewise be mentioned in relation to the poor homogenizing effect that nobody can tell whether the air rating system of the silo is properly functioning or not. The system has never been subject to inspection since commissioning in 1985. It is well known that during the rainy season, long stoppage of the kiln is always planned due to high percentage of water in the raw material causing great difficulties in quarrying and haulage of materials as well as in grinding. The maintenance department has never found it appropriate to dig for compressed material out of the silo and check the air rating system. It is therefore recommended that when opportunity during a long planned stoppage of the kiln becomes actual that the silo be emptied and overhauled.

In addition, to the problems of this section and other sections of the plant, is problem of location of the central compressor station which is directly under the homogenizing silo and thus exposed to heavy dust pollution. This contributes to the inefficient performance and availability of the compressors. The actual situation is that out of three compressors one is totally burnt, the second one is cannibalized in order to keep the third one working under the afore mentioned unsuitable conditions. This has caused deficiency of compressed air all across the plant hampering productivity in general. A mobile compressor is being used presently as a supplementary source which is inadequate because it is not designed for continuous operation over long periods.

6. Kiln/coolers.

The rotary kiln with dimensions of 4,6 x 70 m was furnished with satellite cooler tubes and has a rated capacity of 1600 tpd of clinker. The average output over the last three years has been 1390 tpd which is a utilization factor of 86,8% - and has a fuel consumption of about 900 kcal/kg clinker.

Through the three years of the first phase the greatest constraint to the kiln production was caused by irregularity of power supply but in recent times this has improved considerably with the provision of the 5 Mw generating stand-by power station. Constraints affecting the availability of the kiln has now been shifted to mechanical and production problems.

The frequent mechanical problems, specially on the satellite coolers and other productional faults and errors cost many short and also prolonged stoppages to the detriments of both the refractory life, the mechanical parts of the kiln and the auxiliary machinery. The average percentage running time has been 43,9% over the last three years, up to sept. 1992.

The poor performance of the kiln can be explained by occasional shortage of refractory bricks and castings. But a serious bottleneck in the achievement of a better kiln production is the faulty design of the satellite coolers.

The mission will not abstain from mentioning that through the three weeks stay, out of which the kiln was stopped six days the electrostatic precipitation (EP) did not work at all and an estimated amount of dust of about 10 tph went out of the chimney to the environment. Apart from the pollution of the surroundings the lost raw meal represents a certain value having been quarried, transported, mixed. ground and heated.

7. Cement mills.

The cement milling plant consists of two identical ball mills with air separators for closed circuit grinding, each of a capacity of 52 tph. The average production of the two mills together has been 39,6 tph over the last three years, which is 76% of the rated capacity.

Availability of the mills during the visit of the mission was affected by mechanical problems of the clinker bucket conveyor, the cement elevator and the lack of compressed air. The clinker bucket conveyor to the mills has no stand-by. Lack of spare parts to rectify these mechanical problems contributes immensely to the cement grinding process. The storage capacity of the two cement silos is 9000 t. The dispatch of cement in bulk is very low - about 10-15%.

B. Achievement of the immediate objectives

The strengthening of the capabilities of the national staff operating and maintaining the production line no. II has been achieved to some extent, particularly during the second phase of the project.

The second objective was to achieve the rated production capacity of the cement production line through:

- plant maintenance
- preventive maintenance
- process optimization and control programmes
- improved performance of the existing production system and providing technological assistance in different operational areas.

The above outlined objectives are still far from being achieved. It is the impression of the evaluation mission that "break-down" maintenance is being practiced to a great extent, rather than the use of a normal, regular and planned maintenance programme.

Preventive maintenance which is of imperative importance does exist in planning and on paper but has never come to be executed according to information made available to the mission.

Process optimization is also far from being achieved, which all the aforementioned percentage figures of capacity utilization of each department in the plant bear witness to. The reasons for this are many, as described before: attitude of the staff to work, poor punctuality, lack of incentives etc. is also a factor.

IV. CONCLUSION

It is beyond doubt that the implementation of this technical assistance project approved in 1987 was a must, taking into consideration the bad experience with kiln no.I during the years from 1967 to it's shut down in 1985.

The technical assistance team from the Polish consulting firm consisted of 23 experts during the first phase of three years. The team was made up of engineers in control of management, shift engineers, burners, mechanics, craftsmen etc. all accompanied and co-operating with their Nigerian counterparts. On Oct. 1, 1989 the expert team withdrew from being in control to an advisory position. Nine months later, phase two of the project was started with a reduced number of 13 of UNIDO experts and there was a tendency for a better co-operation between the nationals and the UNIDO experts.

There was a language barrier between the English speaking Nigerian nationals and the Polish experts, particularly during the first phase of the project.

The following might also be related to language problems. The mission was told that during the first phase, there appeared to be a number of "so-called experts" who exhibited lack of basic knowledge in their claimed expertise.

If technical assistance to CCNN has to continue in future it is absolutely a must that all communication between the parties is made in good and comprehensible English to ensure optimum benefits.

Training activities have been carried out and extensive programmes on paper have been elaborated. Out-of-plant institutions in Nigeria and abroad have been visited and some international coursers have been attended, mostly by managerial staff but, it is the impression that the greatest part of the training activities has taken place as in-plant training. It is not believed that normal formalized in-class-room training based on manufacturers' instructions has been practiced to a great extent.

In June 1988 a preventive maintenance section was formally established in order to organize mechanical engineering activities related to systematized inspections, condition monitoring, troubleshooting, requirements of spare parts and consumables etc. in order to reduce down time of equipment and limiting damage to the machinery.

But to the best knowledge the mission obtained through interviews it has not been possible to detect whether this has been carried out in practice. What has been practiced is the so-called "break-down maintenance", which is very costly and often contributes to further extensive damage to machinery and consequently leads to higher unavailability of equipment.

The final conclusion is that CCNN still will require some highly qualified expertise in specific areas to consolidate the gains already obtained.

V. RECOMMENDATIONS

It is very essential to firmly deal with all problems of indiscipline, poor attitude to work as well as the generally low level of commitment and loyalty to the objectives of the company by all cadres of staff at CCNN.

The present procurement procedure for spare parts and new critical equipment is very cumbersome and leads to delays, to the detriment of productivity. The mission suggests that this area be looked in to very seriously so as to allow the board of CCNN to concentrate on budget approvals rather than being involved in procurement action, as is the case at present.

General procurement guidelines should be established to reduce the present very long delays in purchases entailing too much downtime of the plant due to lack of spare parts at the appropriate time.

It is the experience of most Nigerian cement factories where government, particularly state governments unduly interfere with day-to-days management of these plants, that they are not as productive as others with more liberal management expertise. The mission feels that the board of CCNN should learn from this experience in order to meet the desired objectives.

Before the foreign exchange deregulation in Nigeria it was a known fact that availability of convertible currency was a great constraint to the purchase of the necessary spare parts and consumables. However, since the deregulation, difficulties in purchase of foreign currency have been reduced, provided there is a budget to finance it, originating from a profitable production.

Envisaged increased production should start from the quarry. The mission is convinced that with the present condition of the excavation and earth moving equipment as well as the transport dumpers the quarry will not be able to cope with the target of a normal utilization factor of the plant.

It is recommended that procurement of new mobile equipment should be such that a certain uniformity of brand maintained in order to reduce spare part costs.

The amount of money required to purchase the above mentioned new units and maintain the existing ones is substantial and justifies a well designed and well equipped mobile plant workshop for mobile equipment.

The condition of the so-called central compressor station is really critical. Only one out of three compressors is functioning. It is understood that plans are under way to purchase new compressors as soon as the board gives the green light and that they are placed in another dustfree location. There is urgent need to expedite this action.

As known by the staff since the inception of the plant the satellite coolers of the kiln are a serious bottleneck. An early solution and action to this problem is of imperative importance for optimization.

Another constraint is the spare parts-store and the procurement system. The present physically limited space of the store could to some extent be solved right away by removing the spare parts for the old production line I which are occupying one third of the space (value at present, estimated by the store at =N= 10 million). It is suggested that until a final decision on the fate of the old plant is taken, the parts could be stored in steel containers elsewhere.

The store requires a total re-arrangement making use of management experts within the country or as a part of technical assistance in future, if that is desirable. Eventually, computer aided stores management could be an ideal solution if well coordinated with computer assisted procurement and maintenance procedures.

It may be worthwhile for the Cement Manufacturers' Association of Nigeria to establish a cement institute for general training of their members, as most of the plants suffer from the same problems of low productivity as CCNN. Such training forum would enable staff from different locations to learn from one another's problem and find possible solutions through interaction. Likewise it could also lead to interchange and purchase of common spare parts in emergency cases.

As regards recruitment of new personnel and training of same it is recommendable that the management works out a definite policy in order to employ more educated and skilled labours than at present. There will be a constant turn-over of staff of appr. 10-12% annually, which will enable CCNN over a relatively short period to establish a better workforce which, given the right professional training, adequate motivation and some incentives, will form the best basis for increased productivity.

At present a new administration building is being constructed. When the construction is finished and the management has moved from the old buildings, priority should be given to the old administration building which should be converted into a modern training center with sophisticated and adequate training facilities and infrastructure.

Finally, the evaluation mission recommends that technical assistance to CCN should be extended in order to consolidate the achievements reached up to now and to promote full self-reliance and upgrading of the national staff.

The mission therefore recommends a reduced number of technical assistance experts (who in addition to their specialization should also have pedagogical abilities) as follows:

- 1 Training expert with an overall experience in all aspects of production and maintenance issues with a good command of English language verbally as well as in writing.

- 1 chief technical adviser, with extensive experience in mechanical engineering and specialized in general and preventive maintenance, troubleshooting etc.

- 1 production engineer (Chem.engr.) who should be an expert in production planning and quality control.

- 1 electrical/electronic engineer.

- 1 'mobile plant' engineer, who should be an expert in diesel engines.

- 1 stores national expert.

It is proposed that the above mentioned experts should function as a short term team for instance on a one year contract with the main aim of establishing a permanent training department within of CCNN. The job descriptions of the experts are attached as annex no. 9.

The input from CCNN should be:

a) Qualified personnel for training to be lead by the training expert in co-operation with the CCNN training manager.

b) A training center within the existing administration building which contains the necessary space for class rooms, office, library, service facilities and workshops.

c) The necessary stationery and training equipment.

The output should be:

a) An operational permanent training department within CCNN consisting of a training manager and a group of training officers.

b) One operational training center containing the necessary class rooms, office, library, service facilities and workshops.

c) A training concept comprising basic training programmes and training methodologies prepared specifically for CCNN according to actual requirements covering, but not limited to, the following areas:

Mechanical maintenance.
- Preventive maintenance.
- Repair techniques.

Electrical maintenance.
- Preventive maintenance.
- Instrumentation and control systems.

Process
- Kiln operation
- Grinding

and subject to extension to cover the following areas:

Cement plant operation
- Materials management
- Spare parts management
- Waste management
- Health and safety

Pollution control.
- Dust precipitation systems.

d) Training unit consisting of:
- One training manager
- An adequate number of training officers.

e) Junior engineers, foremen and supervisors trained.

f) Through manpower development, to optimize plant performance, internal safety, health and environmental protection.

g) Introduction of procedures concerning measuring, monitoring, and reporting on the training activities and their influence on the performance and efficiency of the plant.

Process Optimization

During the initial stages, the main task of all the above mentioned experts will be to establish a permanent training institution at CCNN. It is expected that the staff and operational personnel

will attain a much better technical understanding and enhance their skills and will, in co-operation with the foreign experts, be able to optimize process capacity, energy consumption and environmental protection in each department.

VI. LESSONS LEARNED

The importance of having a well balanced evaluation team composed of members possessing a combination of technical evaluation and country experience.

The necessity of having a well defined project document section to ease management monitoring and evaluation activities, with more specified objectives and defined targets within specified areas and time schedules.

Annex no. 1

TERMS OF REFERENCE

SF/NIR/86/001 SF/NIR/90/004 Technical Assistance to CCNN PLC.

In-depth Evaluation.

1. Background

The Project

The Cement Company of in Northern Nigeria PLC (CCNN) was planned in 1962 with a capacity of 100.000 tpy. However,it was commissioned in 1967 only and had subsequently start-up problems in terms of erratic power supplies and inadequacy of technical management. In 1975 a decision was taken to re-activate and expand the cement plant to meet increasing demand of cement in the country. The Sokoto Cement Consortium was contracted in 1977 to rehabilitate the existing facilities, including a complete overhaul of old equipment and the delivery of a new cement plant with a capacity of 500.000 tpy, resulting in a total installed capacity of 600.000 tpy.

Other cement plants in Nigeria are located in e.g. Ewekoro, Shagamu, Ashaka, Benue, Nkalagu and Calabar. Their total installed capacity amounted to appr.9 million tpy with an actual production in 1984 of 3.249.000 t i.e. a capacity utilisation of slightly over 30%. At the time the project was designed, self-sufficiency in cement production was expected to be reached around 1992.

The New Nigerian Cement Company LTD (NNDC) established a plan for co-operation with UNIDO in which assistance to CCNN was included. The project was expected to assist the existing production line as well as the new cement plant in management, operation and maintenance and to improve capacity utilisation. Major emphasis in terms of magnitud and capacities was placed on the improvement of capacities of national personnel. The project foresaw significant training activities, such as staff training witin the plant to be carried out during 1987-1988, so that nigerian personnel could take over management, operation and maintenance functions in 1988-1989, whereby UNIDO international experts would remain in a supervisory function in the project during 1989. Training requirements and relevant training programmes were expected to be worked out at an early stage of the project.

With the starting of UNIDO direct support of technical assistance to CCNN in june 1987, one of the first problems tackeled by the UNIDO technical assistance team, including two

short-term experts (Mechanical maintenance expert and production expert) was the detailed technical evaluation of a possible re-activation of production line no. I of 100.000 tpy capacity, which had been laying idle for many years. The approach was to investigate the practical viability of the proposed re-activation of line no. I under the most optimum technical and economic conditions,taking into account the fact that line no. I had heetherto been foreseen as an integrated unit of line no. II, so the overall production and operations of the whole factory was concerned. The findings of a highly powered technical commitee made up of UNIDO experts revealed that the rather deplorable state of the obsolete machinery after prolonged stoppage, combined with the fact that the manufactorers of the said machinery no longer exisisted, only led to a negative decision on the part of CCNN towards production line no. I. which was already handicapped no.II. in respect of lack of indipensable spare parts and equipment, as well as the need to undertake repairwork on the machinery. It was therefore considered appropriate that to the extend possible, available financial resources of the company should be directed towards the undertaking of all necessary repairwork which would enhance higher capacity utilisation of the plant, possible under existing conditions.

A plan of action was agreed upon between CCNN management and UNIDO aiming at obtaining the maximum possible positive result for the project and beyond, focused on the following parameters with subsequent results commented upon as follws:

A) Raw material parameter.
Large reserves of raw materials were established, both from quantitive points of view, to cater for raw amterial requirements of the plant safely over a thirty (30) year period on the basis of an optimum production of 500.000 tpy.

B. Production parameter.
Efforts were made with available equipment and materials to optimize various processing parameters, thereby improving consederably the quality of the Sokoto cement. This positive achievement was justified by the Sokoto cement winning both national and international awards for quality.

C) Plant and equipment parameters.
Extensive diagnosis surveys carried out by the UNIDO team of experts in collaboration with their national counterparts, revealed several bottlenecks in the plant machinery due to wrong or poor designing and faulty installations. Foundational faults of the rotary kiln were also detected and had to be examined by a civil/construction engineer fielded by UNIDO.

Massive correction actions and modifications to the maximum possible extend were applied to ensure maximum availability of the plant, resulting in increase in production.

D) Human resources development.
The overall training needs of the company were identified, analyzed and a master plan for implementation. Training activities untill the present time have covered both on-the-job and in-plant training, overseas training as well as external training programmes within Nigeria.

A review of the performance of UNIDO after three years of technical assistance to CCNN indicated remarkable progress in the implementation of the objectives, but highlighted the needs for a further extension of two years to develop the achievements so far attained. In view of this the board of directors, after due consultation with the Federal Ministry of Industries, approached number of experts envisage for the continuation of project activities beyond july 1990 was reduced from 23 to 13 in accordance with priority areas in the plant that needed specific technical outputs. The second phase under the project number SF/NIR/90/004 aims at consolidating the gains already made in the first phase with respect to manpower development as well as improvement in the capacity utilisation of the dry-process cement production plant of CCNN, through the implementation of suitably designed training programmes and the establishment of plant maintenance process optimization/control programmes, as well as the adoption of operational procedures with the provision of required technical assistance geared towards improvement in plant performance, with subsequent increasee in production output.

With the visit of the CCNN/Sokoto State Government delegation to UNIDO in april 1992 during which a meeting was held with the participation of delegates from Budexpol, the lending organisation from Poland, an informal request was made for an extension of the project for at least one more year. However, it is envisaged that an in-depth evaluation of both phases of the project to be carried out in the third quarter of 1992 and to be followed by triparty review meeting. Only than can the real future of the project be determined.

I. THE EVALUATION

The project is of a magnitude(total budget US $ 4.780.578 which justifies an evaluation of the performance and results. Moreover, menber state of UNIDO requested the agreement and support of financiers to carry out in-depth evaluation of Trust

Fund Projects asthey are so far not sufficiently covered by established evaluation systems of the organisation.

The Cemnent Company of Northern Nigeria agreed to an evaluation of the project as it understood the evaluation as a management tool with which relevance, effectiveness and impact of the project could be improved.

II.SCORE, PURPOSE AND METHOD OF THE EVALUATION

In accordance with UNIDO policies and procedures, the primary purpose of the in-depth evaluation are as follows:

a) To assess the achievements of the project against it's objectives and expected outputs, including a re-examination of the project design;

b) To identify and assess the factors that have facilitated the achievements of the project's objectives, as well as those factors that have impeded the fulfillment of those objectives; .

c) To examine the extent to which the result of the project has contributed towards strengthening the capabilities of the CCNN personnel to manage, operate and maintain the existing cement production lines.

As a part of the above mentioned tasks, the mission will also review wheteher the approach utilized in the project has led to optimum results, or whether another approach could have improved the results. This will include the following (Note the numbering of outputs refers to those given in the last Project Performance Evaluation Report):

d) a review of the assessment of relevance of the approach taken regarding the re-activation of line no. I in terms of economic and technical viability;

e) an assessment of relevance and appropriateness of management, operating and maintenance systems instituted for the purpose of improved plant operation (output 3.1);

f) an evaluation of adequacy of training needs, assess and resultant proposals for assessment covered all issues relevant to manpower and skill requirements as well as human resources management at the plant level (output 3.2.1);

g) verification of the establishment and operations of training infrastructure and programmes as defined and assessed under (f) above (output 3.2.1.);

h) an assessment of the diagnosis of a preventivive maintenance system and
verification whether and which action has been taken to institute or improve a preventive maintenance system;

i) an assessment of the magnitud of the staff trained and capabilities developed and instituted (output 3.2.2.);

j) as analysis of whether the project's main focus on manpower development requirements was justified and whether other factors affected production performance to equally important extend, hence had required parallel remedial measures;

k) an assessment whether factors external to the project, i.e. socio-economic factors, required changes in management, marketing etc. which have been or should have been adressed by the project.

III. COMPOSITION OF THE MISSION

The mission will be composed of: one representative of CCNN as the financier/recipient of the project.
(one representative of the government of Nigeria)
one representative of UNIDO as the executing agency of the project.

These representatives should not have been directly associated with designing, appraising or implementing the project

IV. CONSULTATIONS IN THE FIELD

The mission will consult with the Federal Ministry of Industry, the UNIDO country director and, if required, with the UNDP officer in Lagos. It will also carry out inteviews and consultations with the project staff, i.e. international experts/consultants and national staff of the counterpart. The mission is also expected to visit and discuss with endusers i.e. customers of CCNN such as construction operations and products.

Although the mission should feel free to discuss with all parties concerned on all matters relevant to it's assignment, it is not authorised to make any commitment on behalf of CCNN or UNIDO.

Annex 2

List of persons met

MD/Chief executive	-	Engr.Muhammad Rabiu Saidu
DGM	-	Engr. Jibril Aliyu Usman
AGM (techn.)	-	Engr. Adams A. Yusuf
AGM (engineering)	-	Engr. Ibrahim Gobir
CPE (Hod)	-	Engr. Sunday Adondua
WC (lab)	-	Engr. Musa K. Umar
CE (Hod. Quarry)	-	Engr. John Maliki
ACE (Quarry)	-	Engr. Michael Yaro
CME (Mobile)	-	Engr. Barry Nwahia
ACME -	-	Engr. Haruna Dan Musa
IE (Instrum.)	-	Engr. Musa Kuchi
IE - -	-	Engr. Uchoma Evrighano
EE (Training)	-	Engr. A. Musa Yaya
	-	Engr. Haruna Adinoyi
PM (procure.)	-	Engr. Nuhu Labar
SIM (store)	-	Engr. Abucabar Magaji

UNIDO experts

PM (proj.man.)	-	Engr. Czeslaw Lech
PE (Process)	-	Engr. A. Kachlik
PE (prod.)	-	Engr. Spychaj
EE (Maint.)	-	Engr. Kicrowski
EE (El. Worksh.)	-	Engr. Stanley Sordyl
Kiln spec.	-	Engr. A. Joworowicz
ME (Mech. dept.)	-	Engr. Bednarek
Foreman (Mech.worksh.)	-	J. Krutul
Foreman (Mobile)	-	Jan Grobel
UNDP	-	Engr. dr. Tommy
UNIDO, Vienna	-	Engr. K. Hagan
UNIDO	-	Engr. Marei
FMI	-	Mr. Omonigho
PO, Lagos	-	Engr. A. Ajani

Annex no. 3

Profile of the nigerian cement industry

Company and location	Year established	Inastalled capacity tpy	Techn. partner	Major supplyer
Nkalagu (Anabra)	1954	480.000 (1957) 750.000	F.L.S. DK	F.L.S. DK
Ewekoro (Ogun)	1959	200.000 (1961) 700.000 (1976)	APCM GB	Nickers Polysius
Sokoto (Sokoto)	1962 1985	100.000 (1967) 500.000 (1985)	Ferro-stahl	Miag D
Ukpilla (Bendel)	1965 1965	150.000 (1972) 450.000 (1983)	Cotino-Caro	Krupp/ Polysius
Calabar (Cross River)	1964 1964	100.000 (1970) 400.000 (1978)	Polysius D	Miag D
Sagamu	1975	900.000 (1976)	APCM	F.L.S.
Benue (Gboko)	1975	900.000 (1980)	Cementia	Polysius
Ashaka(Bauchi)	1975	700.000 (1980)	APCM	F.L.S.
Oniggbolo (Benin Repub.)	1978	500.000 (1979)	F.L.S.	F.L.S. DK

Source: Niser-ICD, Lagos

Table 2.3 Local Production of Cement in Nigeria: 1981-1990

Year	Companies							Total (Metric Tonnes)	Total Installed Capacity	Capacity Utilisation (%)
	Ashaka	Bendel	Benue	Calabar	Nkalagu	Sokoto	WAPCO			
1981	664191	192651	388561	58756	145104	-	1394960	2844223	4870000	58.40
1982	711816	212956	749249	50444	-	31000	1506590	3262055	4870000	66.98
1983	593817	182364	716500	19162	-	54691	1374637	2941171	4870000	60.39
1984	619952	40368	665260	8500	123172	42249	1499502	3006003	4920000	61.10
1985	691657	106636	806788	57295	180685	91257	1404930	3339266	5420000	61.61
1986	676733	92946	689793	62035	263811	308183	1403015	3496516	5420000	64.51
1987	736975	131467	553996	56312	236547	229474	1437305	3382076	5250000	64.42
1988	848877	120270	588559	25690	191314	221771	1407243	3403715	5250000	64.83
1989	844013	68059	485359	28652	165886	230575	1141868	2964412	5150000	57.56
1990	820657	107721	493789	46843	127051	243697	1214018	3053776	5000000	61.08

Sources: 1. Cement Manufacturers' Association of Nigeria (CMAN)

2. Field Survey, 1991.

Annex no. 5

National supply, total demand and
supply gab of cement in Nigeria 1981-1990

year	national supply	national demand	supply gab
1981	7.680.000	7.700.000	20.000
1982	7.440.000	7.500.000	60.000
1983	6.550.000	7.400.000	850.000
1984	4.360.000	6.900.000	2.540.000
1985	4.120.000	6.600.000	2.640.000
1986	4.260.000	6.900.000	2.640.000
1987	4.110.000	6.600.000	2.490.000
1988	4.190.000	7.300.000	3.110.000
1980	3.660.000	7.400.000	3.740.000
1990	4.080.000	7.700.000	3.620.000

Source: Consultants field survey

PRODUCTION SUMMARY ANALYSIS DATE: 25-09-92

Figs (Tonnes)	LIMESTONE	RAW MEAL	CLINKER	CEMENT	DESPATCH	GYPSUM	FUEL OIL	PAPER BAG	BURST BAG	CAPACITY	CAP.UTIL
1983 Productn	124,995	101,065	58,084	63,376						[illegible]	64 %
1984 Productn	84,932	79,157	45,822	49,461						[illegible]	49 %
1985 Productn	157,226	171,010	106,703	61,294						[illegible]	14 %
1986 Productn	607,484	437,652	285,931	303,662						500,000	51 %
1987 Productn	450,742	294,266	205,219	223,024						500,000	46 %
1988 Productn	413,564	306,004	189,832	221,179						500,000	44 %
1989 Productn	541,397	336,536	222,963	230,575	[illegible]	3,493	23,205	2,559,920	123,005	500,000	46 %
1990 Productn	[illegible]	331,059	239,561	[illegible]	[illegible]	[illegible]	[illegible]	4,343,332	115,072	500,000	49 %
1991 Productn	511,109	429,[illegible]	185,484	[illegible]	[illegible]	[illegible]	30,054	4,497,248	210,534	500,000	54 %
*1992 Productn	330,799	269,309	159,025	275,103	[illegible]	13,215	22,676	4,474,279		375,000	47 %

* Figures to September 1992

** Report covers 10 years from 1983 to 1992 inclusive.

57.2
41.1
37.9
44.6
47.9
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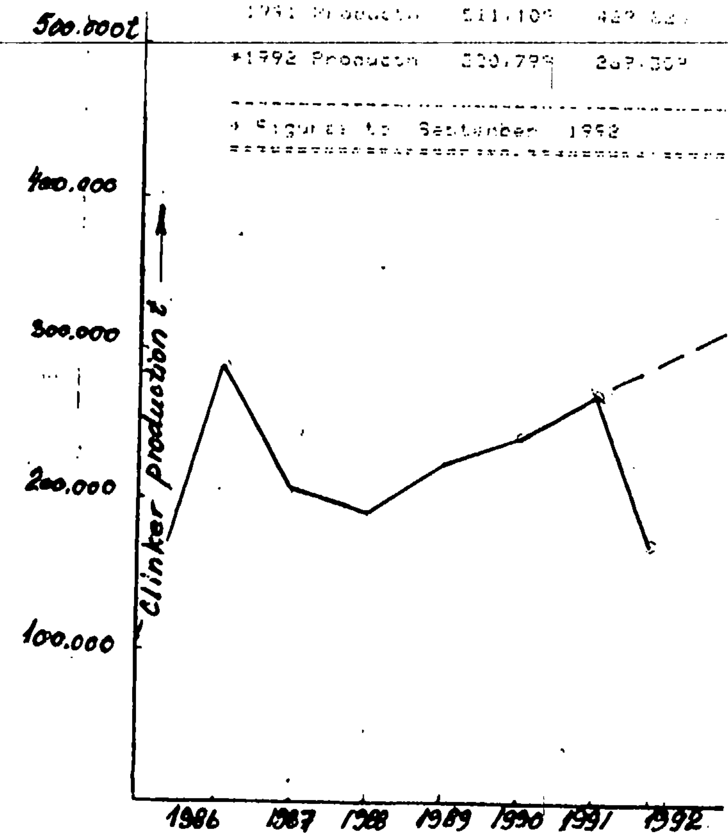
60.1



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* CONN041 * CEMENT CO. OF NORTHERN NIG LTD,SOKOTO PAGE 1

1990

PLANT PERFORMANCE UTILIZATION REPORT DATE: 24-11-92

ALL FIGURES IN HOURS		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
CEMENT MILL 1	MECH MAINT		668.80	337.20	108.60	148.50	5.90	55.40		123.10	47.00	80.30	283.90	1,878.90
	ELEC/INST			15.40	17.30	195.00	665.20	532.70		346.40	469.10	17.70	48.80	2,276.30
	PRODUCTN			47.70	3.10	20.90	2.00	8.60		2.30	20.70	10.50	44.60	160.60
	NEPA			4.20	15.70	9.20	6.40	32.40		6.00	7.70	1.60	8.90	92.30
	OTHERS	744.00		11.00	251.00	58.70			744.00	50.60	23.50	343.20	1.90	2,233.10
	STOP HRS	744.00	668.90	415.70	310.40	342.50	679.50	685.10	744.00	528.40	568.00	453.50	388.10	6,534.00
	RUN HRS		3.30	327.30	302.40	401.00	40.50	58.70		191.60	176.10	261.50	355.90	2,118.70
	TOTAL HRS	744.00	672.00	744.00	720.00	744.00	720.00	744.00	744.00	720.00	744.10	720.00	744.00	8,760.10
	% UTILIZATN		.47	43.99	42.00	53.78	5.62	7.71		26.61	23.66	36.31	47.83	24.18
CEMENT MILL 2	MECH MAINT	63.30	36.31	59.30	643.30		30.60	61.60	29.90	115.10	105.30	145.70	102.60	1,394.41
	ELEC/INST	31.70	4.70	19.70			235.40	10.70	66.80	42.40	11.80	45.20	17.00	485.40
	PRODUCTN	292.20	112.70	10.90			20.40	232.00	20.80	34.00	22.10	157.30	155.00	1,058.40
	NEPA	.06	34.02	1.00			.00	7.50	37.70	16.30	31.80	5.70	2.70	172.78
	OTHERS	3.70	1.80	176.50	12.[illegible]		1.00	49.20	127.60	61.70	7.70	.00	44.20	390.40
	STOP HRS	391.16	191.03	667.40	655.[illegible]		99.20	361.80	334.80	269.70	179.10	353.50	321.50	4,012.99
	RUN HRS	352.34	480.97	76.60	63.80		426.80	382.20	409.20	450.30	564.90	406.10	422.50	4,038.21
	TOTAL HRS	744.00	672.00	744.00	720.00		720.00	744.00	744.00	720.00	744.00	759.60	744.00	8,055.60
	% UTILIZATN	47.42	71.57	10.29	8.86		59.27	51.37	55.00	62.54	75.92	53.46	56.78	50.10
CRUSHER	MECH MAINT						13.70							13.70
	ELEC/INST					10.70	1.20							11.90
	PRODUCTN					249.90	89.30							339.20
	NEPA						20.30							20.30
	OTHERS	4.20	80.40	289.90	323.30	44.50	245.00	359.50	414.20		309.80	302.10		2,379.40
	STOP HRS	4.20	80.40	289.90	323.80	305.10	369.50	359.50	414.20		309.80	302.10		2,764.50
	RUN HRS	110.80	34.60	142.10	156.20	126.60	46.50	56.50	81.80	112.80	122.20	107.90	164.80	1,262.80
	TOTAL HRS	115.00	115.00	432.00	480.00	431.70	416.00	416.00	496.00	112.80	432.00	416.00	164.80	4,027.30
	% UTILIZATN	96.34	30.08	32.89	32.54	29.32	11.17	13.58	16.49	100.00	28.28	25.93	100.00	31.35
KILN	MECH MAINT	5.70		3.80		3.50	3.30	2.40	26.50	8.40	114.80	85.70	4.80	259.10
	ELEC/INST	5.80	2.20	2.40	10.30	33.70	7.50	17.90	2.00	4.20	4.90	10.50	5.20	106.40
	PRODUCTN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	441.30	366.70	294.70	230.20	146.30	221.40	3,542.40
	NEPA	1.50	.03	6.90	14.50	1.60	.80	40.00	65.50	25.40	4.10	6.10	3.90	170.53
	OTHERS		.01	29.50	134.30	.40		21.80	20.00	160.80	57.00	36.10	45.20	555.61
	STOP HRS	304.30	508.04	198.30	206.60	425.10	510.70	523.60	480.70	493.50	411.00	287.30	280.50	4,629.64
	RUN HRS	439.70	163.96	545.70	509.00	318.90	209.30	220.40	263.30	226.50	333.00	432.70	463.50	4,125.96
	TOTAL HRS	744.00	672.00	744.00	720.00	744.00	720.00	744.00	744.00	720.00	744.00	720.00	744.00	8,760.00
	% UTILIZATN	59.09	24.39	73.34	70.69	42.86	29.06	29.62	35.38	31.45	44.75	60.09	62.29	47.10
RAW MILL	MECH MAINT	5.10	.04	107.40	154.50	138.30	19.20	97.70	130.20	20.30	20.30	90.00	49.50	831.54
	ELEC/INST	52.20	7.20	6.70	4.30	9.30	29.40	73.30	39.30	62.60	12.30	33.50	3.60	333.70
	PRODUCTN	332.70	537.70	40.40		9.10	8.30	56.30	91.90	188.30	25.40	17.90	8.20	1,316.20
	NEPA	1.00		6.30	7.70	7.00	.90	40.10	63.60	.10	15.80	10.90	10.60	164.00
	OTHERS	54.00	1.40	184.30	241.00	309.10	482.50	349.40	233.00	266.80	410.20	283.90	342.00	3,164.10
	STOP HRS	445.00	546.34	345.60	405.70	473.30	545.30	616.80	558.00	538.10	484.00	435.20	413.90	5,807.24
	RUN HRS	299.00	125.66	398.40	312.00	270.70	174.70	127.20	186.00	182.70	260.00	284.80	330.10	2,951.26
	TOTAL HRS	744.00	672.00	744.00	720.00	744.00	720.00	744.00	744.00	720.80	744.00	720.00	744.00	8,760.80
	% UTILIZATN	40.18	18.69	53.54	43.33	36.39	24.26	17.09	25.00	25.34	34.94	39.55	44.36	33.68

TOTAL RECORDS PROCESSED 5

Annex no. 7

Annex no. 7

1991

* CONN041 * CEMENT CO. OF NORTHERN NIG LTD.SOKOTO PAGE 1

PLANT PERFORMANCE UTILIZATION REPORT DATE: 24-11-92

ALL FIGURES IN HOURS		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
CEMENT MILL 1	MECH MAINT	17.50	44.50	57.70	63.50	127.90	365.50	105.70	132.40	321.40	139.10	327.90	121.90	1,365.00
	ELEC/INST	25.00	13.80	19.60	37.70	50.50	12.30	53.30	40.70	121.40	30.00	5.30	71.90	480.90
	PRODUCTN	349.10	174.30	335.40	211.70	257.00	54.60	496.40	517.70	90.70	211.00	13.20	34.30	2,745.50
	NEPA	18.20	62.40	2.50	13.70	22.30	7.50	4.50	2.40	10.80	13.00	3.40	3.20	163.90
	OTHERS	9.10	.60		66.30				2.90	.30	8.90	.30	43.10	132.00
	STOP HRS	418.90	295.60	415.20	393.40	457.70	439.90	659.40	696.10	544.60	402.00	350.10	314.40	5,337.30
	RUN HRS	325.10	376.40	328.20	350.60	286.30	280.10	84.60	48.00	175.40	342.00	369.90	429.60	3,396.10
	TOTAL HRS	744.00	672.00	743.40	744.00	744.00	720.00	744.00	744.10	720.00	744.00	720.00	744.00	8,733.50
	% UTILIZATN	43.69	56.01	44.14	47.12	38.48	38.90	11.37	6.45	24.36	45.96	51.37	57.74	38.65
CEMENT MILL 2	MECH MAINT	68.50	45.00	76.10	30.90	158.00	174.90	35.90	8.10		211.40	334.60	170.80	1,622.20
	ELEC/INST	4.10	23.20	11.50	196.60	48.30	11.60				20.00	14.40	130.40	460.10
	PRODUCTN	449.70	191.30	421.80	176.30	290.70	254.70	569.10	593.20		133.20	19.10	7.70	3,107.30
	NEPA	15.10	43.10	3.30	3.00	11.60	19.00	3.10	3.60		12.30	1.20		116.10
	OTHERS				69.10				.20	383.50	2.50	4.30	32.40	493.20
	STOP HRS	537.40	303.10	512.70	497.50	508.40	457.60	608.10	605.10	383.50	379.40	373.50	349.50	5,818.00
	RUN HRS	206.60	377.00	230.60	246.50	[illegible]	[illegible]	135.90	139.90	336.50	364.40	[illegible]	394.50	2,974.20
	TOTAL HRS	744.00	680.10	743.30	744.00	744.00	720.00	744.00	745.00	720.00	743.80	720.00	744.00	8,792.20
	% UTILIZATN	27.76	55.43	31.02	33.13	31.66	36.17	18.26	18.77	46.73	48.99	48.12	52.70	33.82
CRUSHER	MECH MAINT							.90					4.80	5.70
	ELEC/INST												.80	.80
	PRODUCTN													
	NEPA							4.70	1.20		3.50		2.40	11.80
	OTHERS	324.00	223.90	308.90	253.80	291.80	265.70	80.40	89.60	49.00		17.00	58.70	1,962.80
	STOP HRS	324.00	223.90	308.90	253.80	291.80	265.70	86.00	90.80	49.00	3.50	17.00	66.70	1,981.10
	RUN HRS	107.10	110.10	107.10	162.20	123.20	134.30	68.00	63.20	145.00	119.50	161.00	133.33	1,485.03
	TOTAL HRS	431.10	334.00	416.00	416.00	415.00	400.00	154.00	154.00	194.00	123.00	178.00	200.03	3,466.13
	% UTILIZATN	24.34	41.69	25.74	38.99	29.85	33.57	44.15	41.03	74.74	97.15	90.44	66.65	42.34
KILN	MECH MAINT	2.30	.40	6.30	41.60	15.00	13.10	6.00	6.60	167.30	150.50	263.10	156.80	790.50
	ELEC/INST	3.50		1.40	24.80	.70		3.90	1.70	2.10	13.80	11.70	4.10	77.50
	PRODUCTN	371.40	201.30	329.40	211.10	304.00	333.10	542.30	562.00	54.70	90.00	44.20		3,060.30
	NEPA	2.50	7.20	4.00	7.40	4.50	3.60	.80	4.70	117.50	3.40	3.50	1.60	161.50
	OTHERS	41.50							.80	3.80		.30	147.60	194.00
	STOP HRS	421.20	209.40	341.10	294.90	325.20	373.20	553.00	575.80	345.40	257.70	327.80	310.10	4,283.80
	RUN HRS	322.90	462.60	402.90	449.10	418.80	347.60	191.00	168.20	374.60	486.00	392.20	433.90	4,500.00
	TOTAL HRS	744.10	672.00	744.00	744.00	744.00	720.00	744.00	744.00	720.00	743.70	720.00	744.00	8,783.80
	% UTILIZATN	43.39	68.83	54.15	60.36	56.29	48.30	25.67	22.60	52.02	65.34	54.47	65.04	51.23
RAW MILL	MECH MAINT	50.40	17.30	30.20	45.20	61.10	37.00	13.90	26.50	207.40	124.00	107.00	43.90	768.90
	ELEC/INST	4.00	11.50	17.00	24.30	45.20	.50	18.20	31.50	15.10	3.00	4.60	16.50	192.00
	PRODUCTN	376.10	287.70	341.30	353.20	322.90	403.50	574.70	534.30	64.50	221.30	126.30	117.60	3,723.90
	NEPA	3.00	49.70	23.70	9.70	16.90	7.40	3.80	5.60	146.80	15.10	3.70	4.90	290.30
	OTHERS	85.50	1.20							5.70	9.70	170.60	171.60	444.30
	STOP HRS	519.00	367.50	412.20	433.50	446.10	448.40	615.60	597.90	439.50	373.10	412.10	354.50	5,419.40
	RUN HRS	225.00	304.50	331.80	310.50	297.90	271.60	128.40	146.10	280.50	370.90	307.50	389.50	3,364.20
	TOTAL HRS	744.00	672.00	744.00	744.00	744.00	720.00	744.00	744.00	720.00	744.00	719.60	744.00	8,783.60
	% UTILIZATN	30.24	45.31	44.59	41.73	40.04	37.72	17.25	19.63	38.95	49.85	42.73	52.35	38.30

TOTAL RECORDS PROCESSED 5

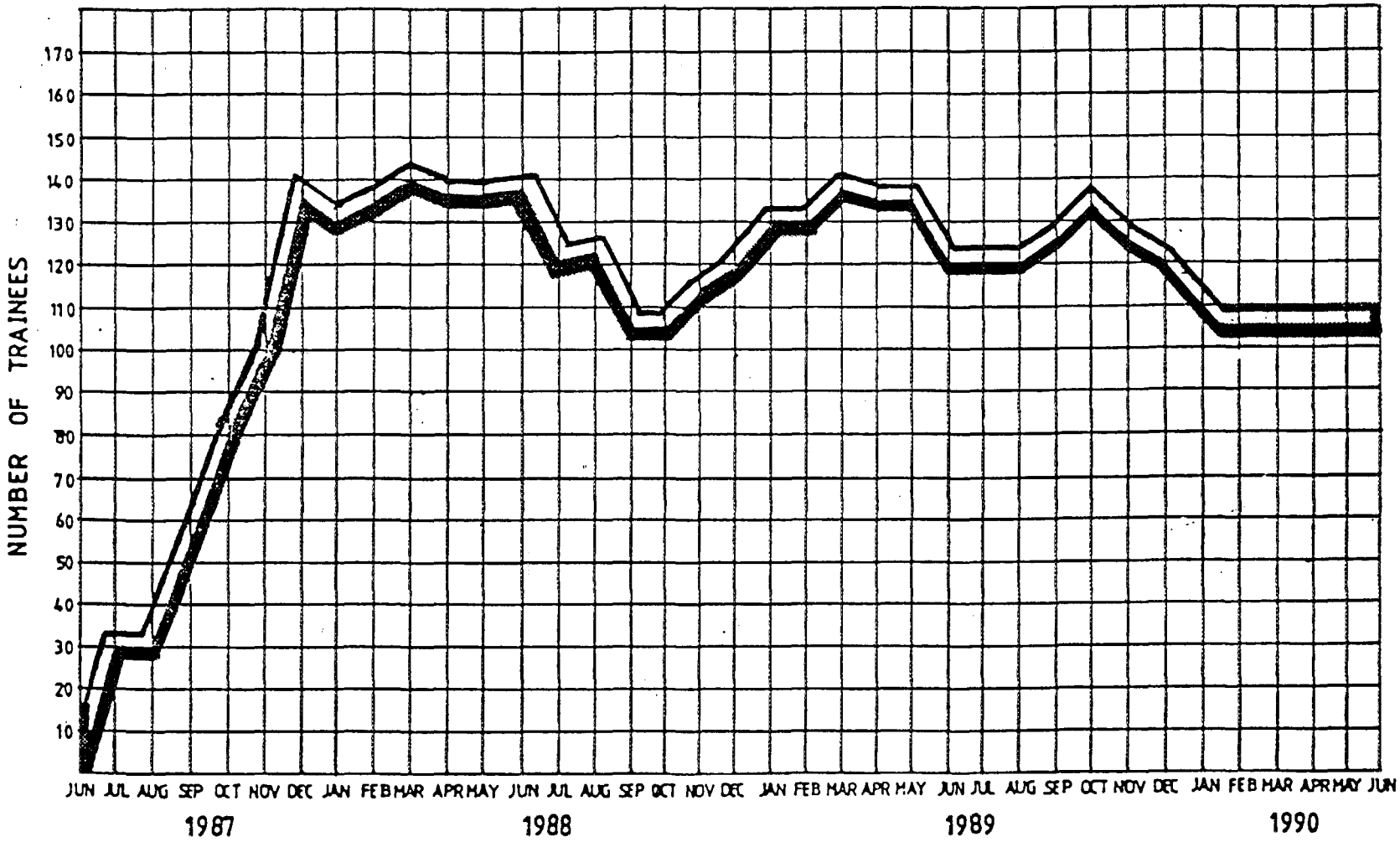
1992

PLANT PERFORMANCE UTILIZATION REPORT DATE: 24-06-92

ALL FIGURES IN HOURS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
CEMENT MILL 1 MECH MAINT	155.20	247.60	264.60	274.00	520.70	451.10							1,913.20
ELEC/INST	76.30	38.20	59.20	79.40	2.40	26.50							282.00
PRODUCTN	81.30	1.00	87.50	115.20	56.60								344.60
MEPA	3.80	14.80	8.70	.50	7.30	6.90							42.00
OTHERS	8.70	6.60	13.60	45.40	25.50	8.40							108.20
STOP HRS	325.30	308.20	433.60	517.50	612.50	492.90							2,690.00
RUN HRS	418.70	387.80	310.40	202.50	131.50	227.10							1,678.00
TOTAL HRS	744.00	696.00	744.00	720.00	744.00	720.00							4,368.00
% UTILIZATN	56.27	55.71	41.72	28.12	17.67	31.54							38.41
CEMENT MILL 2 MECH MAINT		214.30	166.90	182.30	336.80	106.90							1,007.20
ELEC/INST		58.40	101.60	76.00	31.20	291.80							559.00
PRODUCTN		1.00	134.80	130.70	30.00	.20							296.70
MEPA		24.70	2.70	5.60	24.10	6.70							63.80
OTHERS	744.00	.90	19.10	50.00	34.60	21.50							870.10
STOP HRS	744.00	299.30	425.10	384.60	446.70	487.10							2,786.80
RUN HRS		396.70	318.90	335.40	297.30	233.90							1,581.20
TOTAL HRS	744.00	696.00	744.00	720.00	744.00	720.00							4,368.00
% UTILIZATN		56.99	46.65	46.52	39.90	32.38							36.19
CRUSHER MECH MAINT		5.00	52.00	105.40	179.90	113.10							375.40
ELEC/INST	1.00	52.60	2.00		3.00								58.60
PRODUCTN		110.30	186.00	98.20	116.90	56.00							557.40
MEPA	2.00	5.50	3.00	1.40	2.20	6.00							20.10
OTHERS	1.60	48.30	45.30	55.70	77.00	67.40							295.30
STOP HRS	3.60	221.70	289.10	250.70	309.00	232.70							1,306.80
RUN HRS	49.40	138.30	82.90	145.30	47.00	145.30							608.20
TOTAL HRS	53.00	360.00	372.00	396.00	356.00	378.00							1,915.00
% UTILIZATN	93.20	38.41	22.28	36.65	13.20	38.43							31.75
MILL MECH MAINT	514.50	18.90	316.40	76.50	19.50	43.50							984.30
ELEC/INST	3.00	1.30	.80	13.50	3.40	8.50							30.50
PRODUCTN	35.40		342.90	40.70	99.80	100.60							619.40
MEPA		3.60	.50	2.80	3.30	2.20							12.30
OTHERS	72.00	17.20	30.50	17.10	405.20	59.80							605.80
STOP HRS	714.90	41.00	563.50	150.60	535.10	267.20							2,272.30
RUN HRS	29.10	655.00	117.50	569.40	208.90	516.80							2,095.70
TOTAL HRS	744.00	696.00	744.00	720.00	744.00	720.00							4,368.00
% UTILIZATN	3.91	94.11	24.22	79.30	28.07	62.75							47.77
RAW MILL MECH MAINT	.40	133.30	24.30	105.70	6.40	257.60							517.70
ELEC/INST		28.30	24.40	53.40	3.30	3.00							112.40
PRODUCTN		35.40	.40	9.50	4.90	1.00							51.20
MEPA		34.40	5.10	9.50	40.80	15.40							105.20
OTHERS	724.20	48.40	551.70	179.10	529.00	185.10							2,117.50
STOP HRS	724.60	269.80	585.90	356.20	584.40	383.10							2,904.00
RUN HRS	19.40	426.20	158.10	363.80	159.60	336.90							1,464.00
TOTAL HRS	744.00	696.00	744.00	720.00	744.00	720.00							4,368.00
% UTILIZATN	2.60	61.23	21.25	50.52	21.45	46.79							33.51

TOTAL RECORDS PROCESSED 5

TRAINING PLANS FOR CCNN STAFF
1987–1990



Annex 9

Job Description

POST TITLE Training Expert

DURATION One year

DATE REQUIRED

DUTY STATION Sokoto, Nigeria

DUTIES The training expert will be attached to the Federal Ministry of Industry and delegated to CCNN. Specifically the expert will be expected to:

1. Theoretical and practical training in quality control department including operation of X-ray machines for various analyses.

2. Theoretical and practical training in raw material milling and homogenization departments, including special training for handling dust extraction devices, control measurement apparatus, weigh feeders etc.

3. Theoretical and practical training in clinker burning department including operation principles and process and handling of control measurement apparatus.

4. Theoretical and practical training in cement milling department operation principles, milling technology, clinker parameters and characters having bearing on cement milling process.

5. Theoretical and practical training in panel control room.

6. Training in safety methods normally followed in the said departments.

The expert will also be expected to prepare a final report, setting out the finding of the mission and recommendations to the government on further actions which might be taken.

Qualifications Chemical engineer with specialization in cement technology with relevant experience in training of skilled personnel in cement industry, specially in quality control, processing and production of cement.

Language Perfect in english verbally as well as in writing

Job description

POST TITLE Electrical/electronic engineer

DURATION One year

DATE REQUIRED

DUTY STATION Sokoto, Nigeria

DUTIES The expert will be attached to the Federal Ministry of Industries (FMI) and delegated to the CCNN. Specifically the expert will be expected to:

1. Establish and participate in planning a preventive maintenance system as well as specific and general overhauling programme for the electrical instruments, machinery and equipment.

2. Assist the head of electrical division in inspecting, reporting and organizing for carrying out emergency repairs, general overhauling of electrical instruments, machinery and equipment.

3. Participate in supervising the execution of electrical maintenance according to scheduled preventive maintenance programme and to co-ordinate timing with the operational programme.

4. Participate in theoretical and practical training of electrical maintenance personnel required for the general maintenance of the plant.

5. Together with the inventory control expert he has to estimate spare parts and requirements of the plants' instruments and equipments based on suppliers' documentation and the actual consumption to provide the plant with adequate operational coverage as well as assist in checking and updating the available stock of spare parts of the plant and to report to the head of electrical division.

Qualifications University degree in electrical/electronic engineering and at least 10 years of experience.

Language Perfect in english verbally as well as in writing.

Job description

POST TITLE	Cement production engineer
DURATION	One year
DATE REQUIRED	
DUTY STATION	Sokoto, Nigeria
DUTIES	The expert will be attached to the Federal Ministry of Industries (FMI) and delegated to the CCNN. Specifically the expert will be expected to:

1. Supervise production process through all the production departments at the optimum operational efficiency.
2. Participate in theoretical and practical training of production staff and personnel in rational operation procedures.
3. Ensure discipline of workers with respect to instructions through their shift.
4. Eliminate industrial deficiencies as protective measures for machinery.
5. Follow-up on quality control for maintaining standards and fulfillment of specifications.
6. Prepare rationalization for application of implements and economy of materials utilization.
7. Co-ordinate workers efforts in maintenance and operation for keeping up production in case of emergencies.
8. Call in technical personnel for reduction of stoppages.
9. Register operational particulars and proposal of remedial measures.
10. Revise distribution of duties and check work discipline.
11. Report on those in charge of various activities about eventual problems and bottlenecks for adequate action.
12. Inspect shift exchange centers to ensure punctual and regular replacement.
13. Keep up all principles of industrial security and co-ordinate available facilities during emergencies.
14. Execute any other duties pertaining to shift activities.

Qualifications	Graduate chemical engineer with at least 10 years' experience in cement industry.
Language	Perfect in english verbally and as well as in writing.

Job description

POST TITLE	Mobile plant engineer
DURATION	One year
DATE REQUIRED	
DUTY STATION	Sokoto, Nigeria
DUTIES	The training expert will be attached to the Federal Ministry of Industries and delegated to CCNN. Specifically the expert will be expected to:

1. Participate in theoretical and practical training in the techniques of diesel engines and hydraulic equipments.
2. Participate in theoretical and practical training in petrol engines and cars in general.
3. Together with the inventory control expert he has to estimate spare parts life-time and requirements of the mobile plant equipment and instruments based on the suppliers's documentation.
4. Participate in theoretical and practical training in the techniques and maintenance of mobile compressors.
5. Co-ordinate workers efforts in maintenance and operation of the mobile plant equipments.

Qualifications	Diesel and petrol engine technician with extensive knowledge to hydraulic techniques and with at least 10 years of experience in heavy duty equipments.
Language	Perfect in english verbally as well as in writing.

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