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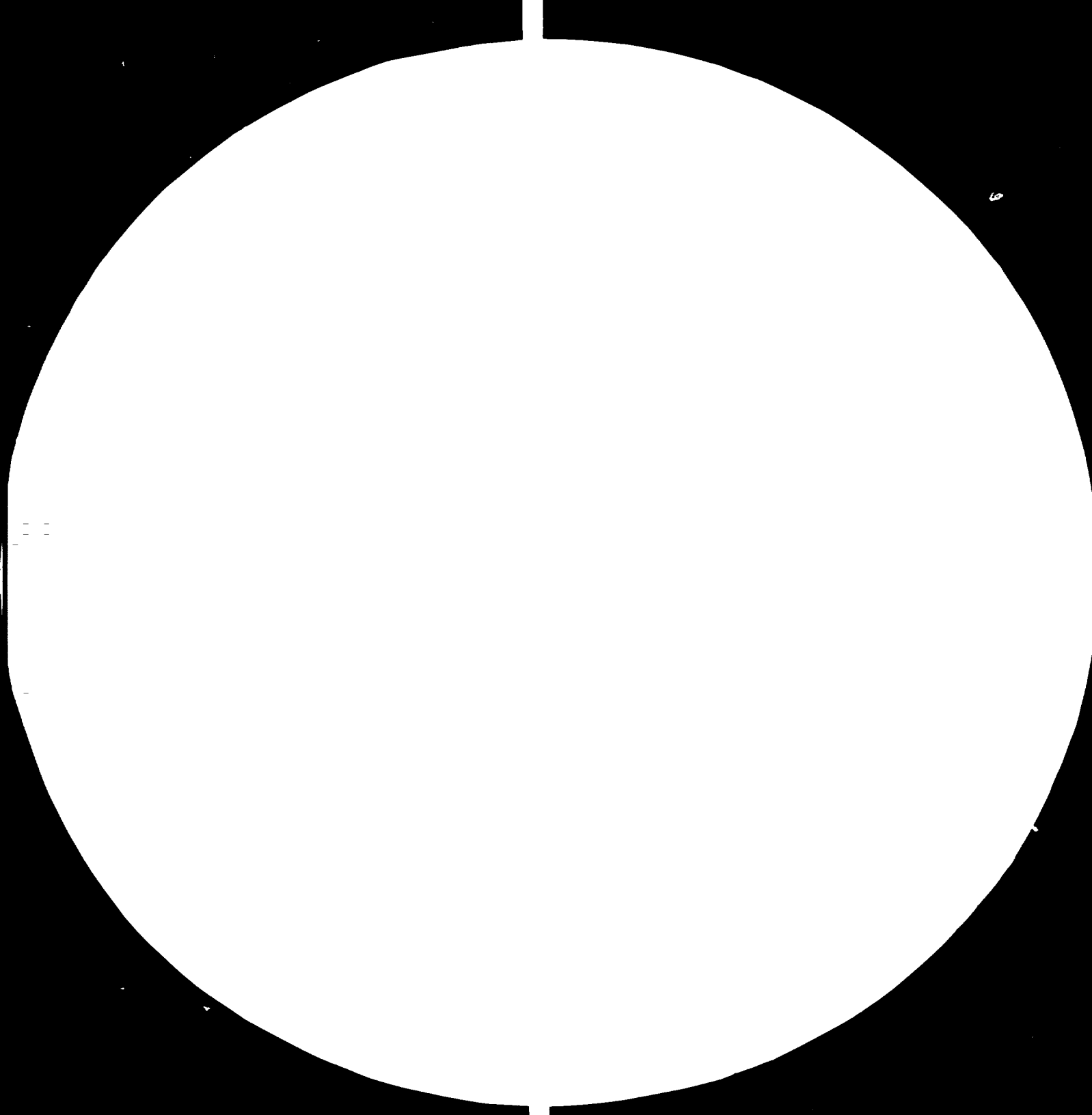
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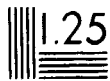
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W. S. GEORGE, JR., *Principal*, GEORGE OPTICAL CO., 1000 N. 17th St., Phoenix, Arizona 85016
Tel. (602) 254-2200

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UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

Distr.
RESTRICTED
UNIDO/IC/R.19
21 May 1982
ENGLISH

STRENGTHENING OF TRAINING CAPABILITIES
OF CRDC, ANKARA, FOR THE BENEFIT
OF TURKEY AND OTHER DEVELOPING
COUNTRIES IN THE FIELD OF
CEMENT INDUSTRY

RP/INT/81/015

13. Aug. 1982

Mission report: Training needs and capabilities
in the field of cement industry in Democratic
Yemen, Jordan and Yemen

Based on the work of Mehmet A. Basman,
cement consultant

V.82-26490

Explanatory notes

Reference to tons is to metric tons.

In addition to the common abbreviations, symbols and terms, the following have been used in this report:

CRDC	Cement Research and Development Centre
HMC	Holderbank Management and Consulting Limited Company
TCDC	Technical Co-operation among Developing Countries

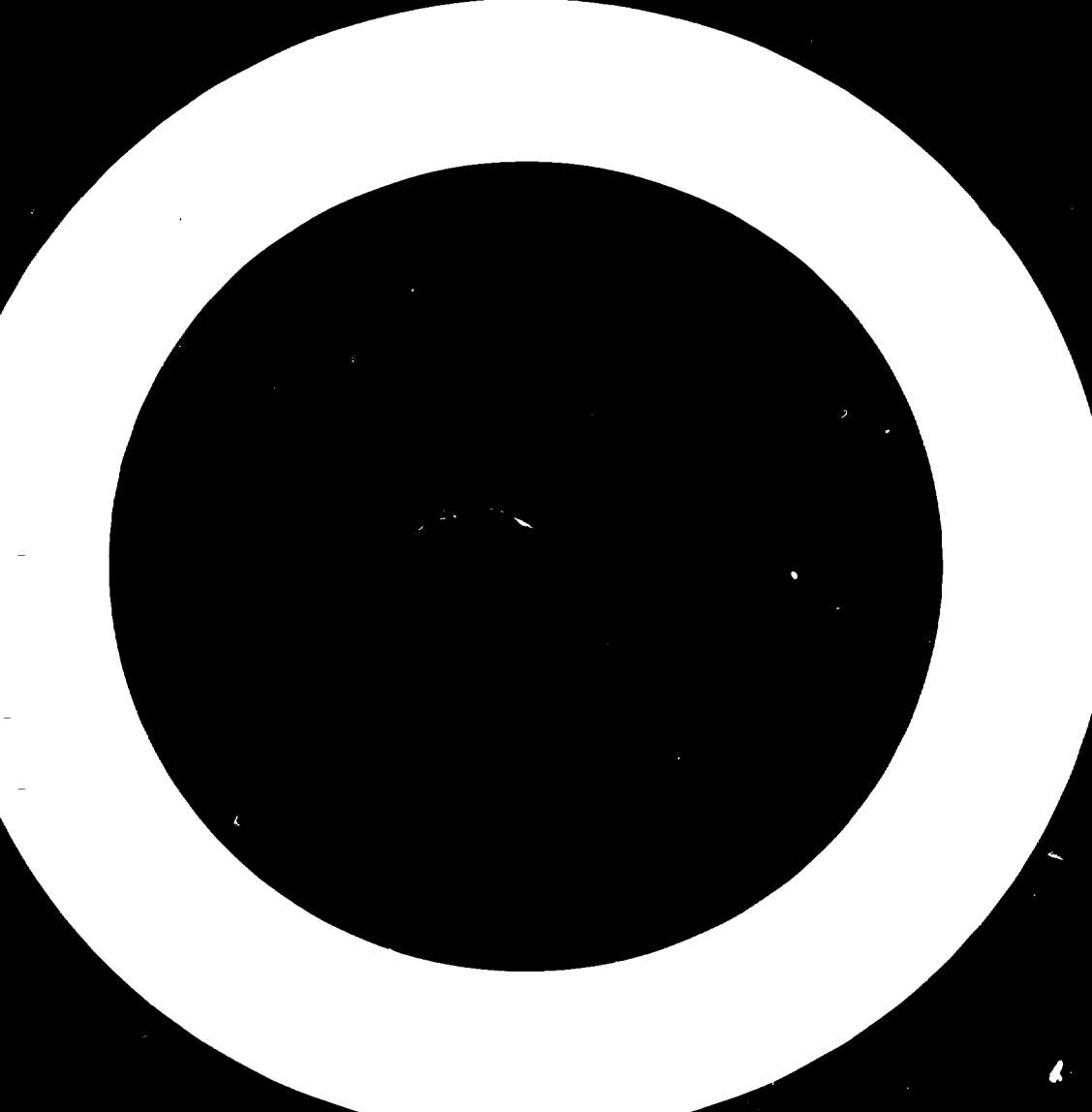
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ABSTRACT

As part of the project "Strengthening of training capabilities of CRDC, Ankara, for the benefit of Turkey and other developing countries in the field of cement industry" (RP/INT/81/015), an expert was sent on a mission of one month to Democratic Yemen, Jordan and Yemen to carry out a training needs assessment in the cement industry and to investigate the possibility of satisfying the identified needs, under the UNIDC-TCDC programme, through the Cement Research and Development Centre (CRDC) of the Turkish Cement Manufacturer's Association, which has accumulated valuable training experience and is organizing, among others, in-plant group training programmes for the benefit of other developing countries.

The expert found that, although the training requirements of the three surveyed countries were of a different degree depending on the development of their cement industry, they could, in addition to the existing arrangements, be met by closer co-operation with CRDC. His recommendations to CRDC include the proposal to develop a special training programme for the factory-establishment phase for the senior staff of the developing countries' cement industry as well as for all technical staff of a future cement plant. For Jordan the expert recommends to transform, with the required assistance, the existing training centre of the Jordan Cement Company into a national or even regional centre, and for Yemen to establish a national cement training centre.



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INTRODUCTION

As part of its activities, the Cement Research and Development Centre (CRDC) of the Turkish Cement Manufacturers' Association is organizing in-plant group training programmes in the field of cement industry for the benefit of other developing countries.

CRDC's training capabilities are excellent. The Centre has experienced instructors and adequate facilities in the Centre itself to conduct the theoretical part of its training programmes; and it has at its disposal the Association's cement plants, equipped with production lines of different size and for various processes to implement the practical part of the programmes.

Technical co-operation between CRDC and the cement industries of the developing countries covered in this report, Democratic Yemen, Jordan and Yemen, in the area of training, would be beneficial to all co-operating parties.

Under the project RP/TUR/80/001 a training expert determined the kind of technical assistance required to strengthen CRDC in those tasks. Based on the recommendations set out in his report and following a request by the Turkish authorities for assistance to the Centre in order to enable it to carry out its training activities on a national, regional and interregional level more effectively, UNIDO approved the present interregional project RP/INT/81/015 "Strengthening of training capabilities of CRDC, Ankara, for the benefit of Turkey and other developing countries in the field of cement industry".

While another expert has been directly assisting the Centre at Ankara, the purpose of the mission of one month covered by this report was to assess the training needs in the field of cement industry in Democratic Yemen, Jordan and Yemen, and to investigate the possibility of satisfying them under the UNIDO-TCDC programme through CRDC which has accumulated valuable training experience in that field.

The expert, who was engaged under the project "Assistance to the Cement Industry" (TF/JOR/80/002) as consultant to the Jordan Cement Company, was released from his actual contract in order to carry out this training needs assessment. His mission started on 11 December 1981 and ended on 7 January 1982.

SUMMARY OF RECOMMENDATIONS

For CRDC

1. CRDC should develop a training programme for the senior staff of the developing countries' cement industries which should concentrate on the factory establishment phase and assist the developing countries in their project preparation and implementation.
2. CRDC should undertake to train also the entire technical personnel of developing countries' cement plants for the establishment phase.
3. CRDC should increase its technical co-operation with regional, national or factory-level training centres existing in developing countries.

For Jordan

4. Jordan should strengthen and expand the existing Training Centre of the Jordan Cement Company and turn it into a national or regional training centre for the cement industry.
5. To strengthen the training capability of the Jordan Cement Company's Training Centre, it should seek and increase technical co-operation with other national and regional training centres.

For Yemen

6. A national training centre for cement industry should be established in the Amran plant.
7. To facilitate the establishment of a national training centre, technical co-operation of Yemen's cement industry with other countries' cement research or training centres, at all levels, should be increased.

For Democratic Yemen

8. The Office Personnel for the Batis Cement Plant project should receive training pertinent to its tasks, and which should be arranged as study tours under the UNIDO-supported TCDC programme.
9. A suitable training programme for the country's first cement plant should be planned.

I. THE CEMENT RESEARCH AND DEVELOPMENT CENTRE OF TURKEY

A. History and activities of CRDC

The Turkish Cement Research and Development Centre (CRDC) was established by the Cement Manufacturers' Association of Turkey with substantial technical assistance and material support of the Federal Republic of Germany, the United Nations Development Programme (UNDP) and UNIDO.

CRDC was and is aimed to assist the Turkish cement industry as well as other Turkish hydraulic binder industries in their operations and in their development. It has at its disposal a large building in a suburb of Ankara comprising laboratories, conference and lecture rooms, a documentation centre etc; it has a modern laboratory and training equipment; and, last but not least, its staff comprises excellent scientists and technicians.

The present main fields of activities of CRDC can be summarized as follows:

- (a) Gathering of scientific, technical and economical data related to cement and other hydraulic binder industries;
- (b) Conducting or insuring the conduct of theoretical and scientific works in order to provide scientific solutions to specific problems of the Turkish cement and other hydraulic binder industries;
- (c) Providing consultancy services for the establishment, extension, operation and development of the Turkish as well as other countries' cement and hydraulic binder industries;
- (d) Organizing training programmes, workshops and seminars at national, regional and international levels;
- (e) On behalf of the Turkish Government, establishing quality control methods for cement and other hydraulic binder products; and, implementing the methods for controlling whether the locally-produced or the imported or exported cement and other hydraulic binder products are within the set-up standards.

B. Assessment of CRDC's training capabilities

Every year, CRDC organizes in the Centre's facilities and in various plants of the Turkish Cement Manufacturers' Association a number of training programmes and workshops. They are offered to engineers and technicians of the Turkish cement industry related to the operation and maintenance

of cement plant equipment as well as to specific problems of the cement industry.

Since 1979, CRDC has in addition organized, in co-operation with UNIDO, four interregional in-plant training programmes to upgrade the skills of engineers and technicians of cement plants in other developing countries.

These in-plant training programmes comprise - depending on the qualifications of the trainees and the duties assigned to the trainees in their country's factory - two to four weeks of theoretical lectures and laboratory work at the CRDC's facilities, and six to eight weeks of practical implementation of the gathered theoretical knowledge in the factories of the Cement Manufacturers' Association of Turkey. These in-plant training programmes are carried out in English.

Considering the interest shown in these regional and interregional in-plant training programmes by the participating developing countries, CRDC and UNIDO are planning to establish a schedule of such training programmes.

In addition, in order to make the programmes more effective, CRDC plans:

(a) To equip and to staff the Turkish public sector's Ankara Cement Plant, located about 10 km from the Centre, for the purpose of carrying out all the practical training;

(b) To establish high-standard lodging facilities in the vicinity of the Centre for the accommodation of the trainees.

Summarizing the above, one can conclude that CRDC provides excellent training, in English language, for upgrading the skills of engineers and technicians of cement factories which are already in operation.

However, when training for the key technical personnel of a new cement plant in a developing country through CRDC-UNIDO co-operation is required, some serious problems arise which need to be solved.

These problems, in order of their importance, are the following.

No guarantees for adequacy of the training

In developing countries, most of the capital-intensive industrial projects are carried out through the consultancy service of an internationally-renowned consultant company and they are awarded to a contractor under a "turn-key" contract which also includes clauses leaving to the contractor (sometimes to the consultant) the whole responsibility of adequately training the personnel of the plant prior to starting the production units. Contracts including training of the plant's management for a period of one or two years are also not seldom.

Although such contracts are quite costly, they are in the developing countries' interests by ensuring efficient plant production or, in other words, secured investment.

It would be very difficult for CRDC and UNIDO, within the framework of TCDC, to conclude an agreement with a developing country's cement industry or with a project consultant or contractor for the training of the technical staff of a new factory, in which the plant output guarantees are clearly stipulated.

Trainees' insufficient knowledge of foreign languages

In almost all developing countries the use of a foreign language, such as English or French, as a working language, is limited to professionals who are graduates from universities, colleges etc. The training of a developing country's technicians, who have a medium-level education and a poor knowledge of foreign languages, therefore poses a linguistic problem which has to be tackled when their training in an interregional or international institution or organization is considered.

Although this problem is solved during in-plant training programmes organized by suppliers or consultants by simultaneously translating the lectures into the local language and by assigning translators to the groups during their on-site training, this solution reduces the efficiency of the training because it hinders considerably the dialogue between trainees and trainers.

Difference in degree of sophistication and automation between training plant and real plant

Cement industries in developing countries usually choose for their plants the latest technological developments in the field; i.e. their plants are equipped with sophisticated material handling machinery and devices and the level of automation of the production process is relatively high.

The plants of the Turkish Cement Manufacturers' Association in which the in-plant training programmes are organized by CRDC/UNIDO, are designed for various simple processes and equipped with unsophisticated handling machinery and devices with proved performance. In fact, these plants are all but one manually operated.

It is certainly advantageous for trainees from developing countries to receive initial training in a plant with relatively simple equipment and manual operation because:

- (a) It facilitates to make them understand the cement manufacturing process;
- (b) It gives them self-confidence in plant operation and maintenance;
- (c) It makes them realize that the sophisticated equipment they have in their own plant is a precious means facilitating their task and is not a must.

However, such training has to be complemented in the factories of the trainees by specific programmes tailored to their plant's equipment, preferably given by instructors or specialists of the company which supplied the equipment.

Training for factory-establishment phase

In most developing countries there is a lack of experienced technical personnel capable of following up the different phases of project implementation. This work, which is usually carried out by a consultant, includes: raw material, market and feasibility studies; specification preparations; contract awards; construction; erection; commissioning etc; and the management of the plant after it has been put into operation.

The theoretical part of CRDC's in-plant training programmes deals with the above-mentioned subjects only to a limited extent, since these programmes are particularly designed for the developing countries' technical personnel having, at least, one year of practical experience in the cement industry.

C. Conclusions and recommendations

From the preceding pages one can draw the conclusion that:

(a) The Cement Research and Development Centre of the Turkish Cement Manufacturers' Association has excellent theoretical and in-plant training capabilities using its own facilities and the Association's factories respectively;

(b) The training programmes organized by the Centre in co-operation with UNIDO have been very fruitful for the cement industries of the participating developing countries;

(c) The Centre is expanding and strengthening its existing training capabilities in the field of cement industry.

Considering the actual training needs of the developing countries' cement industries, particularly of those in the establishment phase, and endeavouring to make use of the excellent training capabilities of the Centre for the benefit of the developing countries and of Turkey, the following recommendations are made:

1. The Centre should develop a training programme preparing the senior staff of the developing countries' cement industries specifically for the factory establishment phase. This programme should include a study tour.

This training programme should be designed for project managers and future plant managers. Emphasis should be given to the techno-economic aspects of the cement industry and to the management of cement projects and plants. The programme should include visits to cement projects being in different stages of implementation and to cement plants with different production process.

This training programme of two or three months duration could be organized within the framework of TCDC, supported by UNIDO or directly through bilateral agreements between CRDC and the countries concerned. It could pave the road for further technical co-operation programmes between CRDC and developing countries for the establishment or the development of their cement industry.

2. The Centre should undertake to train the entire technical personnel of a developing country's cement plant for the establishment phase.

(a) First alternative: Train the technical key personnel theoretically and practically in CRDC's facilities and the Association's plants respectively. Duration: four to five months. Train the technicians of the new plant on site during the erection and commissioning of the plant, by a team consisting of instructors of CRDC and of the plant contractor and assisted by the already CRDC-trained key technical personnel. Duration: nine months;

(b) Second alternative: Train the whole technical personnel in CRDC's facilities theoretically, and the Association's plants practically. Duration: approximately nine months. This training programme should be preceded by a one-month intensive Turkish language course providing the trainees with sufficient language knowledge and technical vocabulary to enable them to communicate directly with the technical personnel of the Association's plants during their approximately half-year practical training. The theoretical training programme of about one month duration should be carried out in English with simultaneous translation into the developing country's language. Finally the training received in Turkey should be complemented by further training on the site of the new factory through a team of instructors described above. Duration: approximately three months.

Both approaches could be organized within the framework of TCDC, supported by UNIDO or, more likely, under a "training sub-contract" between CRDC and the developing country's plant contractor.

3. Technical co-operation with developing countries' regional, national or plant-level training centres should be increased.

The technical co-operation with existing or planned regional, national and plant-level training centres in developing countries should be furthered by:

(a) Providing technical assistance in the establishment and development of their training centres;

(b) Training the instructors of the centres in CRDC's facilities;

(c) Providing CRDC trainers to the centres.

Such technical co-operation could be organized under TCDC, supported by UNIDO, through bilateral technical assistance agreements.

II. THE CEMENT INDUSTRY IN JORDAN

A. The development of Jordan's cement industry

The establishment of the Jordanian cement industry dates back to the early fifties. At present the country has one large-size cement factory in operation, the Fuhais Works of the Jordan Cement Company, situated at a distance of 20 km from Amman; two factories under construction; and a fourth plant under study, the North Cement Plant Project which is sponsored by the Government.

Of the two plants under construction, the Reshadiya Cement Plant of the South Cement Company is of large size, being erected in the Southern part of the country, about 200 km from Aqaba, while the second one, the Zarka-Mafraq plant of the Arabian White Cement Company, a medium-size white cement plant, is going up at a distance of approximately 30 km from Amman.

B. The Fuhais Works of the Jordan Cement Company

The Jordan Cement Company is a public shareholding company. A substantial part of the Company's shares is owned by the government or national institutions. The Company has the monopoly for the sale of locally produced and imported cement within the country.

The actual production capacity of the Company's Fuhais Works is 1,250 t/d of clinker or approximately 1.25 million t/a of cement. This production is realized by:

- (a) Three semi-dry process units with a capacity of 200, 300 and 300 t/d of clinker, commissioned in 1954, 1960 and 1963, respectively;
- (b) One dry-process production unit, equipped with four-stage suspended cyclone preheater, with a capacity of 700 t/d of clinker, commissioned in 1968 and updated in 1981;
- (c) One dry-process production unit, also equipped with four-stage suspended cyclone preheater, and a capacity of 2,000 t/d of clinker, commissioned in 1980.

These production units, with the exception of the last one, are manually operated; the latter unit's operation is computer-controlled.

The Fuhais Works' extension project for the addition of a new, modern dry-process unit, equipped with precalciner for the production of 3,000 t/d of clinker is under implementation. This project is conducted by Holderbank Management and Consulting Limited Company (HMC) of Switzerland, as consultant to the Company, and Mitsubishi Corporation of Japan was awarded a "turn-key" basis contract. The new unit is planned to be commissioned in early 1983.

In addition to this, a feasibility study is being carried out by HMC for a further extension by another production unit for 3,000 t/d of clinker.

With the materialization of the ongoing and anticipated extension projects, the Fuhais Works' total production capacity would reach to 9,500 t/d of clinker or approximately 3 million t/a of cement.

C. The Reshadiya Plant of the South Cement Company

The export-aimed Reshadiya Cement Project was sponsored by the National Planning Counsel of the Government of Jordan. It has recently been handed over to the public shareholding South Cement Company, founded by the Government. At present, the Government is the main shareholder of the Company and the Jordan Cement Company owns 10 per cent of its shares.

The technical aspects of the project have been carried out by Kaiser Engineers Incorporation, United States of America, as consultant to the Government. The project has been awarded to Mitsubishi Corporation, Japan, under a "turn-key" contract.

The Reshadiya Plant will consist of two parallel production units, each equipped with precalciners for 3,000 t/d of clinker, i.e. for approximately 1 million t/a of cement each. The factory will be linked by road to the Amman-Aqaba highway and by rail to the Aqaba port facilities.

The commissioning of the production units is scheduled to take place towards the end of 1984 for the first unit and at the beginning of 1985 for the second.

D. The Zerka-Mafraq Plant of the Arabian White Cement Company

The Arabian White Cement Company is one of the companies owned by the Syrian-Jordanian Industrial Company established by the Syrian and Jordanian Governments with equal capital participation.

The Zerka-Mafraq Plant will consist of one production unit with a yearly capacity of 300,000 t of white cement.

The project was carried out by Basse-Sambre ERI S.A., Belgium, as consultant to the Company. The project has been awarded to BKMI Industrieanlagen GmbH, Federal Republic of Germany, under a "turn-key" contract. The commissioning of the plant is planned to take place at the beginning of 1984.

E. North cement plant project

Preliminary studies are being carried out by the Government of Jordan for a new export-aimed cement plant in the Northern part of Jordan with a yearly capacity of 2 million t of cement. This project could be materialized by 1988.

III. THE TRAINING NEEDS AND CAPABILITIES OF JORDAN'S CEMENT INDUSTRY

A. The overall situation

Twenty-eight years after the establishment of the cement industry in Jordan, the Jordan Cement Company is still short of skilled and experienced engineers and technicians in its Fuhais Works, and it has difficulties to find in the country the technical personnel with the required qualifications.

Lack of skilled labour is not a particular problem of the Jordan Cement Company, but a general problem of the country as a whole. Among the Arab countries, Jordan is one of the most fortunate having a very large number of graduated professionals, trained technicians and skilled manpower, educated at Jordanian universities and other educational institutions, or abroad. However, their availability within Jordan is very limited, which is due to the very attractive job opportunities in the oil-producing countries which drain continuously the skilled and experienced manpower of Jordan.

On the other hand, the country, and particularly the Jordan cement industry, are benefitting from this manpower drain. The savings of the Jordanians working abroad are mainly invested in housing in their home country.

B. The training needs of the Jordan Cement Company

The training needs of the Jordan Cement Company are growing in parallel with the successive expansion of its Fuhais Works. The Fuhais Works, which was a small factory at its establishment, is going to be the largest cement plant of the whole Middle-East.

Since its establishment, the Jordan Cement Company has considered the upgrading of the skills of its technical personnel and the familiarizing of its new recruits with the cement manufacturing technology an important task. According to a programme, the company has sent most of its technical personnel abroad to participate in training programmes and seminars related to the cement industry and organized by international bodies, private consulting companies or by suppliers of equipment for cement factories.

The Company has also hired instructors from cement machinery and equipment manufacturers to carry out, in its Fuhais Works, training courses familiarizing the plant personnel with the operation and the maintenance of the Works' specific equipment.

In addition, it has been co-operating with the Vocational Training Corporation of Jordan for training its workshops' workers and for providing practical training opportunities to the students of the Corporation.

Finally, the Company, in order to co-ordinate its training activities and to meet its factory's technical personnel requirements for the new production line planned to be commissioned at the beginning of 1983, established in November 1981 its own training centre.

C. The Training Centre of the Jordan Cement Company

The Company's Training Centre, established in November 1981, aims to design and implement various training programmes to upgrade the skills of the factory's existing and newly-recruited staff in order to ensure an efficient plant operation and to provide the factory with a sound technical management.

The Centre is accommodated on the top floor of the Fuhais Works four-storey administrative building. The assignment of the whole building to the Centre is under consideration. The Centre covers an area of 400 m²; it comprises three classrooms for 12 trainees each, a library and offices for the management, the secretariat, and the instructors. It disposes of adequate equipment for efficiently conducting the training programmes and for reproducing or editing the written material in English and Arabic. Its head, the former Works Manager of the plant, is assisted by an engineer experienced in training.

When establishing the Centre, the Company also delegated to its consultant, HMC, for a period of one year, the technical management of the Fuhais Works and the task to carry out theoretical and practical training programmes in the Centre's facilities as well as in the factory. This training is given in English by instructors assigned by the consultant. The written material is translated into Arabic and edited by the Centre.

These training programmes are attended by all technical staff of the factory. The Company now considers to repeat and extend them to include also the technical personnel for the new Reshadiya Cement Plant.

D. The training needs of the Reshadiya Cement Plant

The Reshadiya Cement Plant is under construction and its commissioning is scheduled for 1984. The entire manpower for this new plant has to be trained during its construction.

The Reshadiya Cement Project, sponsored by the National Planning Council and awarded to the Japanese Mitsubishi Corporation under a "turn-key" basis contract, has recently been handed over by the Council to the newly-formed public shareholding South Cement Company.

The new company is in its own organization phase; certainly, the recruitment and the training of the technical personnel for the plant will be among its first activities.

The training of the technical personnel of the Reshadiya plant is included in the "turn-key" contract concluded between the Council and Mitsubishi and gives the contractor full responsibility for the following:

- (a) In-plant training in Japan of the technical key personnel for 50 man-months (quarry, production, quality control, mechanical and electrical maintenance, instrumentation, power house and plant safety engineering);
- (b) On-site training at Reshadiya for 50 man-months, during the erection of the plant, of technicians and workers by instructors of the contractor and the already trained key personnel.

E. The training needs of the Arabian White Cement Company

The factory of the Arabian White Cement Company is under construction and is planned to be commissioned in early 1984. For this factory too, all technical staff has to be trained. Again, the training of the technical personnel is included in the "turn-key" contract concluded between the Arabian White Cement Company and BKMI Industrieanlagen GmbH, the contractor of the project. According to that contract the training should comprise:

(a) In-plant training in the Federal Republic of Germany, of 20 technical key personnel of the factory for 100 man-months;

(b) On-site training in Jordan of technicians and workers for 20 man-months during the erection of the plant, by instructors of the contractor together with the already trained technical key personnel.

F. Conclusions and recommendations

The conclusions from the previous sections are that Jordan's training needs in the field of cement industry are considerable and will be particularly acute in 1983 when training will be required for the whole technical personnel of one existing cement plant which is doubling its capacity the staff of another large cement plant, and that of a medium-size white cement plant, both under construction.

The arrangements made independently by the plants concerned are adequate for meeting their individual training requirements.

Considering the future development of the cement industry in Jordan and the prevailing shortage of skilled manpower, the following recommendations are made:

1. A national or regional training centre for the cement industry should be established in Jordan.

Jordan is reaching a level of cement production which requires the country to be self-sufficient in covering its training needs as well as its research and development activities in that field.

The Training Centre established by the Jordan Cement Company should, with the joint efforts of the other cement factories under construction or study, and the support of the Government, be expanded to a national or regional training centre, because the Centre:

(a) Disposes already of adequate facilities for theoretical training, the extension of which is under consideration;

(b) Has an excellent in-plant training potential as in the Company's Fuhais Works various production units of different size and for processes from the simplest to the most sophisticated are available;

(c) Has gathered valuable experience in cement production.

2. Technical co-operation of the Jordan Cement Company's Training Centre with existing national and regional training centres should be enhanced.

In addition to the technical co-operation of the Training Centre with the Company's consultant, a collaboration with existing national or regional cement research, development and training centres would provide to the Centre new dimensions for planning and implementing its future activities.

Such technical co-operation should first comprise mainly training arrangements to strengthen the Centre's training capabilities. At a later stage the inclusion of research and development into the activities of the Centre should be considered. This co-operation could be organized by UNIDO or through direct contact with existing training centres, such as CRDC at Ankara.

At the first stage of technical co-operation with existing training centres, the training capacities and capabilities of the Centre should be strengthened by the following:

(a) The presently-employed senior staff should receive adequate training in training methodology and logistics;

(b) A second Assistant Director should be appointed and also be provided with the above-mentioned training by a UNIDO Industrial Training Co-ordinator and the other technical experts listed below, as well as through UNIDO fellowships;

(c) The staff mentioned under (a) and (b) and the administrative personnel of the Centre, who would be employed on a full-time basis, should survey the training needs of the cement industry in Jordan and, as far as possible, those of the region, and plan the training together with the UNIDO Training Co-ordinator. The latter would also be responsible for the training of the trainers, including the following technical personnel required to implement the national and regional training programmes:

One process-control expert
One quality-control expert
Three maintenance experts (electrical, mechanical and electronic)

These five experts could initially be assigned on a part-time basis to implement ad-hoc training programmes and later, depending on the requirements of the Centre, be employed full time;

(d) In addition to the Industrial Training Coordinator, UNIDO should, for the first training programmes to be organized by the Centre, assign short-term experts in the fields indicated above, (preferably recruited from CRDC), who would assist and train their counterparts.

IV. THE CEMENT INDUSTRY IN YEMEN

A. The development of Yemen's cement industry

The Yemen cement industry was established by the Government in 1973 and at present the country possesses one operating cement factory, the Bajil Cement Plant of the Bajil Cement Corporation. A second factory, the Amran Cement Plant, is under construction and a third, the Mafraq Cement Project is still in its study phase. The cement industry in Yemen is sponsored and supervised by the Government. The production units have the status of separate public sector corporations under the supervision of the Ministry of Industry and Commerce.

B. The Bajil Cement Plant

The Bajil Cement Plant of the Bajil Cement Corporation is located near Bajil town, on the Hudeida- San'a' road, approximately 50 km from Hudeida.

The Bajil Cement Plant Project which started in 1967, has been planned, financed and implemented under a bilateral technical assistance programme between the Union of Soviet Socialist Republics and Yemen. The plant was commissioned in 1973.

The plant has one wet-process production unit with a capacity of 230 t/d of clinker or about 80,000 t/a of cement. The plant is being extended under the same bi-lateral assistance programme by a unit for 1,000 t/d of clinker, again wet-process technology. This extension project, which will raise the production capacity of the plant from 80,000 to 400,000 t/a of cement, is planned to be accomplished towards the end of 1983.

C. Amran Cement Plant Project

The government-sponsored Amran Cement Plant Project is located near Amran town, approximately 100 km north of San'a'.

The project, which is conducted by the Ministry of Industry and Commerce and technically assisted by the Bureau Central d'Etudes pour les Equipements d'Outre Mer (BCEOM), France, the government consultant, has been awarded to Ishikawajima-Harima Heavy Industries Company Limited (IHI), Japan, under a "turn-key" contract.

The plant will comprise a complete, modern, centrally-operated production unit equipped with a four-stage suspended cyclone preheater and precalciner with a production capacity of 1,500 t/a of clinker or approximately 500,000 t of cement per year. The commissioning of the production unit is planned to take place in July 1982.

D. Mafrag Cement Plant Project

Studies for a new cement plant for 500,000 t/a from the limestone deposit located near the bifurcation of the Taizz-El Mocha-San'a' roads are being carried out by BCEOM as government consultant. It is estimated that this new plant will be operational by 1986.

V. THE TRAINING NEEDS OF THE YEMENI CEMENT INDUSTRY

A. The overall situation

Due to prevailing socio-economic conditions in Yemen, the availability of technical manpower is rather limited. Engineers are educated in foreign universities and engineering schools, particularly in such countries which provide fellowships. Technicians are trained in recently-established technical schools at San'a'; however, this locally-educated technical personnel does not meet the country's requirements. Part of this limited technical manpower is still drained by more attractive salaries offered in the oil-producing Arab countries.

This shortage forces the country's cement industry to recruit at times technical personnel with insufficient background and to anticipate additional basic training for them.

B. The training needs of the Bajil Cement Plant

The Plant's training needs in the field of cement technology as well as in basic training are continuously covered by long-term programmes established under the USSR-Yemen bilateral technical assistance programme.

The technical personnel recruited for the operation and the maintenance of the existing 230 t/a production line (three engineers and 50 technical key personnel) has received three to six months training in the Soviet Union and another six-months training on site at the Bajil plant, during its construction.

Since the commissioning of this line, which took place in 1973, the plant's technical personnel has been assisted by a team of Soviet instructors (six engineers and 16 technicians) in the line operation and maintenance.

Similar training arrangements have been undertaken for the extension project: 20 additional technicians will be trained abroad and on site before the commissioning of the new line; and 19 additional Soviet instructors will join the existing training team of the plant.

C. The training needs of the Amran Cement Plant

All technical staff of that plant needs to be trained. Under the turn-key contract, the contractor, IHI, bears full responsibility for all training required for the plant's operation and maintenance.

In addition a management contract of one year has been concluded between the Government and IHI.

The training programme for the technical staff as stipulated in the contract includes:

- (a) Four months in-plant training in Japan for the 12 technical key personnel of the plant, i.e. 48 man-months of training;
- (b) Seven months on-site training during the erection and the commissioning of the plant for the 120 technicians of the plant (including the 12 key personnel), by 15 instructors from Japan assisted by the 12 Japan-trained key personnel. This training amounts to 264 man-months.

The first part of this training programme has been satisfactorily accomplished in 1981. The recruited 12 key personnel - one mechanical engineer and two chemical technologists, four high-school graduates with two years additional scientific or economic education, three high-school graduates and one technical-school graduate - who will assume functions as production, quarry, laboratory and maintenance (mechanical, electrical and instrumentation) engineers, as kiln and power-house supervisor and as laboratory X-ray technician, received very intensive in-plant training of four months in Ibuke Cement Works, a plant of the Osaka Cement Corporation, the training sub-contractor of IHI, and they have returned to San'a'.

In spite of some shortcomings in the technical background of some of the trainees, the evaluations made by the training sub-contractor have shown that they have obtained sufficient knowledge to follow the second part of the training without major difficulties.

The second part of the training programme, i.e. training the plant's 120 technicians on site, will start in mid-February. These additional 108 trainees have already been recruited and 13 of them, who would be formed as kiln and mill operators, have received a preliminary training in the Bajil Cement Plant and will get further training in a cement factory in Iraq till mid-February.

The theoretical courses of the on-site training will be held in the facilities of the Amran plant. The training will be carried out in English and translated into Arabic by the Japan-trained key personnel. The comprehensive written material is also in English language.

D. Conclusions and recommendations

We may conclude from the previous sections that the training needs of the Yemeni cement industry are relatively large. The country has to train the whole personnel of a new medium-sized dry-process cement plant, the additional technical personnel of an existing wet-process plant which extends its production capacity fivefold and, in the near future, the whole personnel for another medium-sized cement plant.

The technical manpower shortage forces the cement industry to recruit also personnel without adequate technical background and to provide for them additional basic training.

The dispositions taken and the arrangements made independently in order to meet their own training requirements are adequate for the Amran cement plant and more than adequate for the Bajil plant.

In the light of the future development of the cement industry in Yemen and the lack of technical manpower, the following recommendations are made:

1. The nucleus of a national training centre for the cement industry should be established in the Amran Plant.

This centre should have the following tasks:

- (a) Assess the real training needs of the existing cement plants and of those in the planning stage;
- (b) Plan, design and implement suitable training programmes.

The Amran Cement Plant has in many respects a good potential for accommodating such a training centre, because:

- (a) The location of the plant is very suitable as it is not far from the capital of the country;
- (b) The plant is equipped with a dry-process production line of modern conception and could provide excellent in-plant training for other cement plant personnel;

(c) The plant has lodging facilities which could also be used to accommodate trainees from other factories;

(d) The plant is getting experience in training, the contractors' training programme being implemented;

(e) The plant, under the management contract of IHI, will get experience in a sound technical management.

The first steps to be undertaken in the establishment of a national training centre would be as follows:

(a) To accommodate the Centre within the facilities of the Amran Plant;

(b) To provide the Centre with a secretariat for translating and printing the written training material;

(c) To designate as head of the Centre an expert with experience in training, whose main task would be the establishment of the Centre itself.

2. Technical co-operation of Yemen's cement industry with other countries' cement research and development or training centres at all levels should be increased. The technical co-operation of the cement industry of Yemen with the other countries' cement research and development centres or with only training centres at factory, national or regional levels would help the country in covering its training needs and in establishing its national training centre.

Such technical co-operation could be materialized under UNIDO-supported TCDC programmes or by bilateral arrangements between Yemen's cement industry and the respective centres.

VI. THE TRAINING NEEDS OF DEMOCRATIC YEMEN

A. The development of the Democratic Yemen's cement industry

The cement industry in Democratic Yemen is in its establishment phase.

Since 1969, raw material, cement market and techno-economic studies have been carried out for the establishment of a cement plant in the Abyan province where suitable limestone is available.

Due to the relatively limited demand for cement within the country and in view of the high investment costs for the proposed projects, the establishment of an indigenous cement industry has been continuously postponed.

Recent studies carried out in the same region by Girocement-Leningrad, USSR, show that the techno-economical feasibility of establishing a cement plant near the Batis village, with a dry-process production unit of 250,000 t/a. The proposed location of the Batis plant is about 100 km east of Aden and, 20 km from the small town Zangi-Bar on the Indian Ocean shore.

B. The Batis Cement Plant Project

The Government is seriously considering the implementation of this Batis project, and has established, within the Ministry of Industry and Commerce, the Batis Cement Project Office. The Office is headed by a chemical engineer graduated from Hungary and specialized in silicate chemistry and technology, who is assisted by an economist. The recruitment to the Office of an electrical engineer and another chemical engineer in 1982 and the recruitment of a mechanical engineer and an accountant in 1983 are planned.

The actual tasks of the Office are to complement the techno-economic studies of the Batis Cement Plant Project prepared by Girocement-Leningrad, and to finalize the project's technical specifications and contract's conditions and terms which would, most likely, be implemented under a Democratic Yemen-USSR bilateral technical assistance programme.

The next tasks of the Office would be to supervise construction, erection and commissioning, to recruit and train the personnel, and, finally, the technical and commercial management of the plant. The Office estimates that the Batis Cement Plant contract could be finalized during 1982 and that the plant could be commissioned towards the end of 1986.

C. The training needs of the Batis Cement Plant Project

According to the tentative implementation schedule, the complete technical staff of the plant will have to be trained in 1985.

The Girocement-Leningrad proposal includes the training of all technical staff of the plant; the key personnel abroad, and the plant technicians on site.

In order to supervise the construction, erection and commissioning of the plant, to organize and to follow up the plant training programmes and finally to operate and maintain the production units efficiently, the staff of the Project Office needs also to be trained. Training of the Office staff could, according to the recruitment plan for the Office personnel, be scheduled for three months for two trainees each, in 1982, 1983 and 1984.

D. Conclusions and recommendations

The conclusions from the above are that, while the Democratic Yemen's cement industry is still in the establishment phase, the project personnel needs to be trained and that, parallel with the project implementation, the training of the whole cement plant personnel will have to be undertaken in 1985, probably by the plant contractor.

The recommendations are as follows:

1. Training of the project personnel

The training of the Batis Cement Project Office personnel should concentrate on the techno-economic aspect of the cement industry and the management of cement projects and cement plants. It could be realized through special training programmes to be organized in institutions of countries having long experiences in cement plant establishments or through study tours to be organized under UNIDO-supported TCDC programmes.

2. Planning the training programme of the Country's first cement plant

This training programme should be undertaken together with the implementation of the Batis Cement Plant Project. Contacts with existing factory or national training centres should be established to strengthen this programme with additional long-term theoretical and in-plant training.

Annex I

JOB DESCRIPTION

RP/INT/81/015/11-02/31.5.C.

Post title	Cement Training Expert
Duration	One month
Date required	As soon as possible
Duty station	Ankara, with travel to selected Arab countries (Democratic Yemen, Jordan and Yemen)
Purpose of project	<p>In co-operation with UNIDO, Turkey has organized an in-plant group training programme in the field of cement industry for the benefit of industrial personnel from other developing countries. Based on the evaluation, the programme is expected to be repeated in the following years. The programme is organized under UNIDO's activities of co-operation among developing countries.</p> <p>This mission is intended to assess the training needs of selected countries to enable the training management in Turkey to organize the programme more in line with the training needs of other developing countries. The mission is also intended to assess the training capabilities of the countries to be visited and suggest measures to strengthen these facilities in order to enable UNIDO and the Turkish authorities to assist these countries to conduct training programmes for their own personnel by transferring the accumulated experience of Turkey.</p>
Duties	<p>The expert will be attached to the Turkish Cement Research Development Center (CRDC) of the Cement Producers' Association of Turkey, located near Ankara. In addition to the interregional programme in the field of cement industry organized annually by CRDC since 1979, Turkey in co-operation with UNIDO, is organizing a special programme from October to December 1981 for Bangladesh, Somalia and Sudan and a high-level meeting in the field of cement industry in December 1981.</p> <p>A five-year training programme is also envisaged for the Islamic countries.</p>

Therefore, the mission is also intended to assess the training needs of the Islamic countries and the expert is expected to travel to Democratic Yemen, Jordan and Yemen^{a/} and to prepare a final report, setting out the findings of his mission and his recommendations to the interested governments and UNIDO for further action.

Qualifications

University degree, preferably in economics, engineering or adult education. Experience in industrial training for engineering personnel.

Language

English or French, Arabic an asset.

Background information

The strengthening of the training capabilities of the above countries has the aim of enabling them to meet their training needs and establish a training capability particularly through the technical assistance to be provided by the CRDC.

^{a/} In Jordan 5 to 11 December; in Democratic Yemen 20 to 24 December and in Yemen 25 to 30 December.

Annex II

TIME SCHEDULE OF THE MISSION

The time schedule of the mission, which was several times readjusted due to the flight cancellations and the counterparts' availabilities, was finally as follows:

11-19 December 1981	Ankara	Briefing on the training capabilities and facilities of CRDC of the Turkish Cement Manufacturers' Association. Participation to the UNIDO-CRDC Seminar on Technical Co-operation between Developing Countries organized for high-level representatives of developing countries. At this seminar the representatives of Democratic Yemen, Jordan and Yemen were present.
20-24 December 1981	Amman	Assessment of Jordan's training needs and capabilities in the field of cement industry.
25-31 December 1981	San'a' Bajil Amran	Assessment of Yemen's training needs and capabilities in the field of cement industry.
1-7 January 1982	Aden	Assessment of the Democratic Yemen's training needs and capabilities in the field of cement industry.
17-19 March 1982	Vienna	Debriefing

Annex III

OFFICIALS MET DURING MISSION

Democratic Yemen

Salem A. Al-Ammari	Project Manager of Batis Cement
Fuad M. Abdulkerim	Deputy Project Manager of Batis Cement
Abdulkerim Surani	Deputy Resident Representative of UNDP
Muhammad Sadullah	Programme Officer of UNDP
K. Dessai	Project Manager of UNIDO Advisory Unit

Jordan

Shawkat Sboul	Managing Director of the Jordan Cement Company, Board Member of South Cement Company
Hani Khammash	Director of Jordan Cement Company's Training Centre
Esham El-Tahar	Managing Director of Syrian-Jordanian Industrial Company
Thabit Jaradat	Acting Project Manager of Arabian White Cement Company
Adnan Raouf	Resident Co-ordinator of UNDP
Adnan Naghaway	Programme Officer of UNDP

Turkey

Sedat Yildiz	Chairman of the Turkish Cement Manufacturers' Association
Faruk Yagiz	Director of CRDC
Kismet Burian	Deputy Director of CRDC
Beyhan Bertan	Head of CRDC's Training Section
Kayihan KÖksal	Head of CRDC's Process Control Section
Filiz Gençer	Programme Officer of UNDP

Yemen

Muhammad Al-Shahaty	Minister of Trade and Industry
Muhammad Saeedi	Under-Secretary of Ministry of Trade and Industry
Huseyin Kebiri	Project Manager of Amran Cement
Muhammad Semawi	Chairman of Bajil Cement Corporation
G. Godfrain	Deputy Resident Representative of UNDP

