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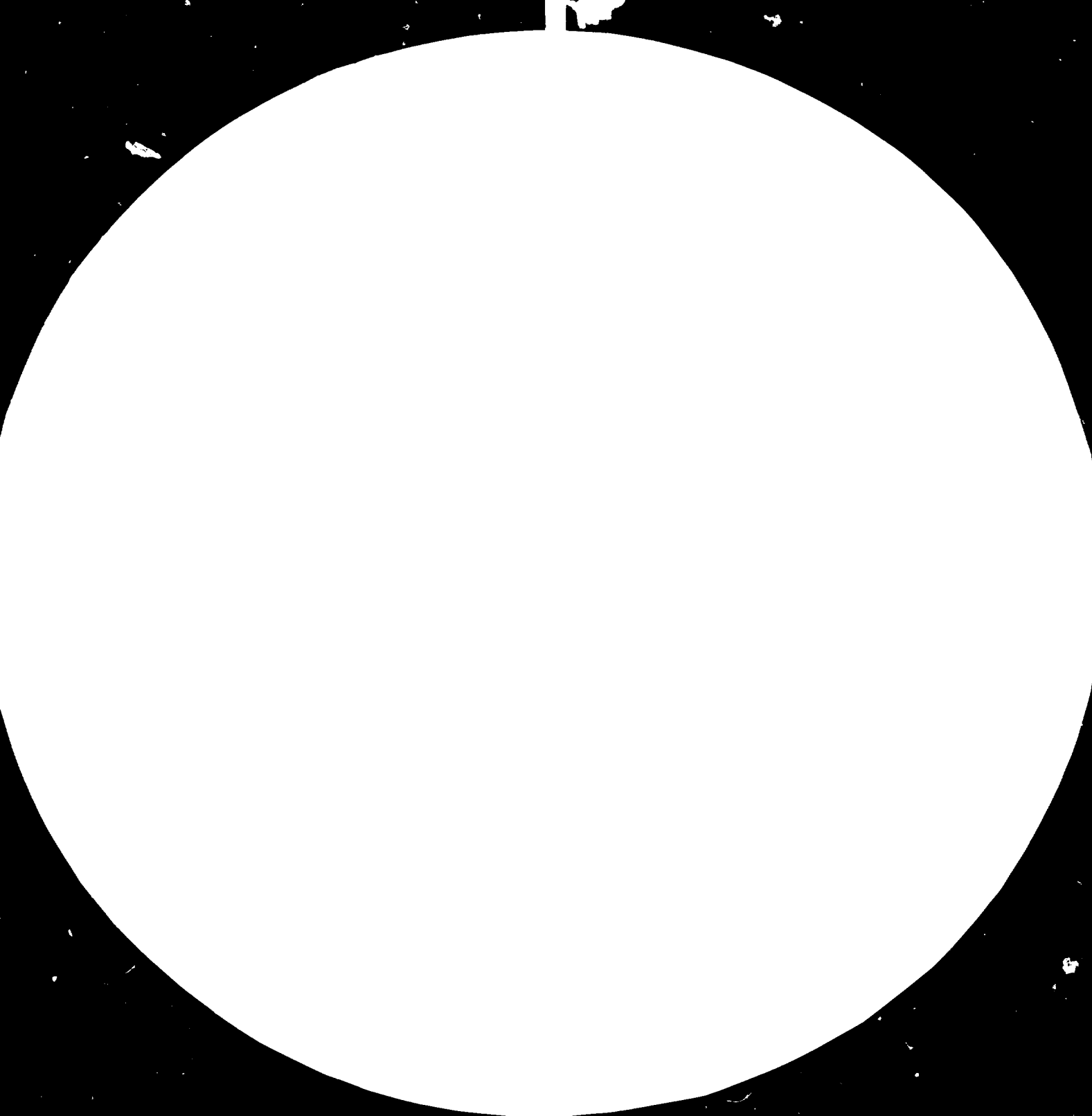
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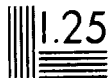
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The Urwick Group

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UNITED NATIONS INDUSTRIAL  
DEVELOPMENT ORGANISATION

[Egypt.  
MANAGEMENT INFORMATION SYSTEM  
FOR  
ARAB CONTRACTORS.]

FINAL REPORT

430

16 December 1982

Submitted by:- D. H. Tucker

Client Copies:- UNIDO (30)  
ARAB CONTRACTORS (12)

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I. INTRODUCTION

This Final Report records work done on the first stage of the Management Information System for Arab Contractors (UNIDO Ref: DP/EGY/80/018). In it, we discuss project progress, the main areas of work, key issues arising, and conclude with proposals for the next phase of development.

The report contains 26 appendices. For convenience, the MIS Course Notes (Appendix VIII), and the two systems specifications (Appendices XX and XXIII) are submitted separately. Each volume contains a Contents List for ease of reference.

Terms of Reference for the project are contained in Annexe D to the contract document No. 781/48, as modified in agreement with UNIDO and Arab Contractors and incorporated in our report 'MIS - Initiation of Project' dated March 1982 (Appendix I).

II. PROGRESS SUMMARY

We briefly summarise the main points:

A. WORK PLAN

The agreed programme of work has comprised five main phases:-

- Phase 0 - Updating of MIS Study
- Phase 1 - System Design Skills Development Programme
- Phase 2 - Construction Project Management SDP
- Phase 3 - PSD Budgeting and Financial Reporting
- Phase 4 - Conceptual Definition of Project Control System

The target date for completion of these five phases was 16 December 1982.

B. WORK DONE

The work programme has been carried out in accordance with the specified time-table. Some further course material is to be provided under Phase 2.

Details of progress are fully documented in:-

- Progress Report No. 1 (Appendix II)
- Interim Report (Appendix III)
- Progress Report No. 2 (Appendix VI)
- Project Evaluation Report (Appendix VII).

In addition to these formal reports, progress was also reported verbally on several occasions to UNIDO representatives in Egypt and to Arab Contractors. Note was also taken of the UNIDO comments on our Interim Report (see letter of 26.8.1982 at Appendix V).

Other points of interest are:-

- a summary in Arabic of our Interim Report was prepared and issued to senior executives of Arab Contractors (Appendix IV)
- the scope of the project control system was limited, in agreement with Arab Contractors, to consideration of the planning and control procedures required after the award of a contract. This was done in order to avoid duplication of the work being carried out by other consultants and members of the Management Development Department. As a result of this limitation, we were able to develop the system in more detail than implied by the term 'conceptual definition'
- numerous additional papers have been prepared on such matters as budgeting, contribution, capital employed, cost control, and inflation accounting. These are intended to form a background to the MIS development and are discussed in more detail in subsequent sections of this report.



## C. PROJECT REVIEW

Apart from the progress reports referred to above, a formal review of the project was carried out on two separate occasions:-

1. Technical Review

A technical review of the project was undertaken on 6th December. Those present were:-

UNIDO	- Mr. A. Perez-Venero
UNDP (Egypt)	- Mrs M. Hetata
Arab Contractors	- Eng. Suzanne
	- Mr. Bahgat
	- Eng. Nadia Hetata
Urwick International	- Mr. J. P. Clark
	- Mr. D. H. Tucker

Satisfaction was expressed with the progress of the project and the results achieved. However, there was also general agreement that the full benefits of the project would only be realised if the systems designed during Stage I are implemented. We discuss in Section V below our proposals for the next Stage of development.

Following this review, we were asked to complete a Project Evaluation Report which we attach at Appendix VII. In it we designate the results achieved as 'better than anticipated'.

2. Final Review

A further review was carried out on 11th December. Those present were:-

UNIDO	- Mr. A. Perez-Venero
UNDP (Egypt)	- Mr. F. Hartvelt
	- Mr. T. Sabry
	- Mrs. M. Hetata
Arab Contractors	- Eng. Suzanne
	- Mr. Bahgat
Urwick International	- Mr. D. H. Tucker

The findings of the technical review were endorsed with further emphasis on the need to proceed to the next stage of development subject to the availability of funds.

III. EDUCATION AND TRAINING

We now summarise the main features of the training given during the project.

A. COURSES GIVEN

A series of formal courses was held on the principles of MIS and systems design. Some 40 managers and senior technical staff attended the four courses. These staff were drawn from a wide range of the Company's operations, including branches, IBUs, divisional H.Q.s, and central departments. A full list of the course members is given in our Interim Report (Appendix III) and Progress Report No. 2 (Appendix VI). The course programme and course notes are attached at Appendix VIII; other course material, including visual aids, has been passed to Arab Contractors.

After the fourth and final course, members were asked to complete a course evaluation report, the results of which are summarised in Appendix IX under 4 main headings:-

- Was course helpful?
- Was participants' knowledge of subject increased?
- Was pressure of course correct?
- What was the quality of presentation?

In parallel with these formal courses, the project has involved considerable 'on the job' training for selected counterparts from the Management Development Department and other areas of the Company. The object of this training was twofold:-

- to ensure there was a minimum number of Arab Contractors staff able to carry on the training process after completion of the project
- to ensure these staff were fully conversant with details of the new systems and able to participate fully in any subsequent implementation programme.

We feel it appropriate at this point to record our appreciation of the co-operation and contributions received from our counterparts.

B. SYSTEMS PRESENTATIONS

The new systems have been discussed extensively with senior management and with the participating 'pilot' branches:-

- Canal and Sinai
- Earth-moving

In addition, a formal presentation of the new systems was given on 28th and 30th November. The programme for these presentations and the staff attending are attached at Appendices X and XI respectively.

As a result of the 'feed-back' obtained from these discussions with prospective users, a number of valuable modifications have been made to the draft systems specifications and incorporated in this final report.

C. SEMINAR ON MODERN MANAGEMENT PRACTICES

In order to promote the development and understanding of MIS, a seminar was held on 5th December in which the present project was presented as the latest stage in the introduction and evolution of modern management practices in Arab Contractors.

Distinguished visitors to this seminar included:-

- H.E. The Minister of State for Administrative Development - Mr. Abd el Baki
- H.E. The Ambassador, Head of International Co-operation for Development at the Ministry of Foreign Affairs - Mr. Ismail Abdel Mouty
- The Resident Representative of UNDP in Egypt - Mr. Luciano Cappelletti
- The Chairman of Arab Contractors, Eng. Hussein Osman, and other senior Board members.

The programme for the seminar, people attending, and the official MIS hand-out are attached at Appendices XII - XIV. The seminar was also widely reported in the Egyptian press.

IV. SYSTEMS DEVELOPMENT AND DESIGN

We now discuss the principal systems which have been developed and the key issues arising. We would point out that these systems - project control, budgeting and financial reporting - form only two aspects of the total MIS described in our Interim Report of 31 July 82. It should also be noted that both specifications form part of an integrated reporting system which includes work on business planning and tendering carried out by other teams.

A. APPROACH

In the Interim Report, we proposed a framework for the corporate MIS which was closely allied to the organisation structure of Arab Contractors and to the key decision areas in this structure. Particular emphasis was placed on the following points:-

- need to set financial objectives at each level of the organisation in order to provide guidelines for operational planning
- importance of the planning function, with special reference to the annual budget, as a means of exercising effective control
- use of a standard reporting system, including uniform terminology, definitions, and formats to provide consistency in the preparation and interpretation of management reports
- introduction of more selective forms of reporting based on key indicators of performance and variance analysis designed to identify 'exceptions'
- adoption of a common 'database', whether computerised or manual, as a further aid to consistent reporting.

Although we have worked closely with selected 'pilot' branches, our approach has been dictated by the need for a uniform and integrated company-based MIS. The advantage of this approach is that the performance of one operating unit can be compared directly with another although their activities may be very different. We have therefore sought to develop the basic elements of information common to all units. At the same time, we believe this standard system can be readily 'customised' to meet the information needs of particular units.

In addition to operating units, equal attention has been given to the planning and control mechanisms of central services and departments in order to promote more effective management of 'overheads'.

The basic reporting standards are set out in Appendix XV and are illustrated in the two systems specifications discussed below. In terms of accounting standards, these are largely defined by the national system of unified accounting which, for obvious reasons, we have adopted.

## B. BUDGETING AND FINANCIAL REPORTING

We briefly summarise the key points:-

### 1. Budgeting

We have discussed in earlier reports the need for realistic budgets as a vital element of both planning and control. Our views and proposals have been further developed in the following documents:-

- Budgeting Guidelines (Appendix XVI)
- Preparation of Budgets (Appendix XVII)

In these documents we have emphasised the need for:-

- corporate guidelines on financial policy and objectives
- objective analysis of market and business performance data as the basis for future plans
- formal procedures for each stage of the budgeting cycle:-
  - estimating
  - planning
  - evaluation and review
  - monitoring and control
- establishment of a central budgeting authority to assist the Board in formulating objectives and evaluating results and to plan and co-ordinate the preparation of budgets.

2. Contribution and Overheads

The attached paper on Contribution and Overheads (see Appendix XVIII) sets out the present treatment of overhead apportionment and recovery and argues in favour of a different approach based on full contribution accounting. With this system of accounting, central overheads are not apportioned to operating units or projects but are treated as 'fixed' expenditure which must be covered by 'contributions' from the trading activities of the company if it is to make a profit.

The advantages of this approach are:-

- it promotes more effective control of central costs
- operating units and contracts are no longer loaded with costs which their management cannot control
- the 'unfair' element involved in any method of cost apportionment is removed
- book-keeping systems can be simplified with a corresponding saving in time and cost
- a clear distinction is drawn between contribution and profit.

3. Capital Employed

It is sometimes difficult to arrive at a satisfactory definition of capital employed, e.g. is it the funds invested in the business or the assets acquired with these funds? The paper attached at Appendix XIX is designed to provide a standard definition for one of the key indicators of profitability, the return on capital employed.

In this paper we argue for the adoption of Average Capital Employed as the base in preference to alternative concepts such as the return on Net Worth or Total Capital Employed. We do so for the following reasons:-

- we regard it as good business practice that management should be concerned with the effective use of all capital, and not just with that part of the capital provided by the shareholder(s) or generated by the company itself

- we also believe that the return on capital should reflect the fact that the generation of profit depends on a changing level of resources. Since the return is designed to measure the profitability of these resources we consider that profit should be related to the average level of resources in the accounting period.

4. Systems Specification

The systems specification at Appendix XX incorporates the concepts described above. Reports are based on comparisons with budgets and analyses of variances. They have been grouped into three main sections covering:-

- Profitability (analyses of contribution, profit, and return)
- Productivity (cost and overhead control)
- Financial Resources (cashflow, borrowings, debtors)

The reports are designed to provide planning and control information for the three main levels of the management structure:-

- Company
- Division
- Branch/Department

Note:- Project reporting is discussed in Section C. below.

As well as outputs we have included notes on the sources of information and input records with particular emphasis on current omissions, delays, and other problems. As stated earlier, this document has been widely discussed and is, at present, the subject of a pilot exercise in completing the reports.

## C. PROJECT CONTROL

The base of the reporting structure is formed by the project control system. More importantly, the ultimate profitability of the company rests on its ability to plan and control projects effectively. We now describe key points of the work carried out in this area.

### 1. Planning and Control

We have stated earlier (Section II. B. above) that the scope of the system has been limited to consideration of the post-award phase of contracts. This limitation reflects the work already done by other consultants and members of the Management Development Department in the areas of pre-planning, tender preparation, and the use of 'S' curve analysis techniques.

We describe our approach in Appendix XXI. The main features are:-

- need to break down the total project into smaller units of time, work, and cost in order to plan and control them more effectively
- three levels of planning and control are proposed:-
  - 'stages' which are units of time of approximately 3 months duration
  - 'activities' which are standard types of work common to most projects
  - 'cost centres' which are clearly identifiable units of production or services (including site overheads)
- resources and costs relating to these three levels are to be analysed as follows:-
  - direct costs
  - indirect costs
  - fixed costs (including 'once off costs')
- overhead costs are to be apportioned to production units on a suitable basis so that the total cost of these units can be directly related to contract revenue



- actual costs are to be compared with an 'allowed cost' based on standard rates for each type of resource, e.g. labour, materials, etc.

2. 'S' Curve Analysis

This technique has recently been introduced by Arab Contractors and is now applied to most construction projects. We believe there is scope for improvement in its present application which we explain in Appendix XXII.

Although the technique is currently used for control purposes, it can also be applied to project planning in the form of the 'Ideal 'S' Curve' concept. We believe this concept requires further examination to see if it is applicable to the types of construction project carried out by Arab Contractors.

3. Systems Specification

The specification is attached at Appendix XXIII. In it, we include specimen reports on:

- Project Planning (Post-Award)
  - Work Programme
  - Resource Schedules
  - Budget
  - Cash Flow
- Project Control
  - Progress
  - Costs (including cost centre and activity analyses)
  - Claims
  - Productivity
  - Forecasts of Resources and Costs.

We indicate the types of 'exception' to be reported to branch and divisional management.

Also included are a number of worksheets giving the details required to calculate productivity factors for labour, materials, and PEV. Comments on basic accounting records have been incorporated in the notes on input sources and records which form part of the specification for the Budgeting and Financial Reporting system (Appendix XX).

#### D. INFLATION ACCOUNTING

Our proposals on inflation accounting are recorded in Appendix XXIV. We discuss the steps already taken by Arab Contractors and the two main approaches adopted in developed countries:-

- Current Purchasing Power
- Current Cost Accounting

We make the point that both these approaches are still the subject of considerable debate among business men and accountants.

We go on to describe the application of current cost techniques, which have been accepted as the accounting standard in the U.K., in respect of fixed assets, costs, and working capital. Examples are given of the adjustments required in order to measure historical performance.

We then discuss the treatment of future inflation in terms of tendering and preparing budgets, and suggest the use of computerised modelling techniques to examine alternative plans.

We conclude with a list of initial steps to be taken which are:-

- establish a corporate strategy for inflation in terms of future work
- evaluate official inflation statistics published in Egypt (although we believe this exercise will not produce very fruitful results)
- collect price data from suppliers and other sources within the company in order to build up internal price indices.

V. IMPLEMENTATION

The work programme which has just finished represents the first stage only of MIS development in Arab Contractors. The systems and proposals described above have yet to be implemented. If UNIDO and the Company are to obtain the full benefits of the investment which has already been made, this first stage will need to be followed by a further programme of implementation.

At a meeting with representatives of UNIDO, UNDP, and Arab Contractors on 6th December, we were asked to submit proposals for this second stage of development. These proposals are attached at Appendix XXV and follow UNIDO guidelines. We summarise the main points.

A. NEXT STEPS

We see the next steps as follows:-

1. Education and Training

- continue the process of education in the concepts and application of MIS by means of:-
  - an internal training syllabus for middle management along the lines already established by previous MIS courses
  - seminars for senior managers to familiarise them with the work already done and the principles involved.

2. Systems Implementation

- implement the new project control, budgeting and financial reporting systems in selected projects, branches, and central departments.

3. Further Systems Development

- develop and implement the budgeting procedures advocated in this report by the start of the next financial year (July 1983)
- commence the classification of assets and collection of price data needed for inflation accounting purposes
- evaluate the feasibility of applying computerised modelling techniques to the preparation of budgets and adjustments for inflation.

B. TIME, RESOURCES AND COSTS

An implementation plan for this programme of work is attached at Appendix XXVI. This plan is designed to accomplish the tasks involved in nine calendar months from the start date of Stage 2. We consider it important that the initial implementation programme should be kept as concise as possible in order to:-

- minimise the additional workload and cost involved in running old and new systems in parallel
- maintain management interest and participation in the development of the new systems
- ensure, as far as possible, continuity of personnel.

In our proposals we identify both the internal and external resources required to meet the planned work programme. We would point out that a number of trained counterparts now exist who are well qualified to take part in this work.

The estimated total cost of external resources is some US\$ 175,000 - 190,000.

This cost is, of course, subject to negotiation depending on the method of financing adopted and the agreed ratio of external to internal resources.

C. LONG TERM

During the course of the Stage 2 programme, the results of the initial implementation plan would be evaluated. This evaluation would then form the basis of a master plan for subsequent phases of implementation.

We cannot at this stage predict how long it will take to implement the new systems throughout the whole company. However, we are confident that, by the end of Stage 2, there will be a sufficient number of trained staff in MDD able to supervise this work.

VI. CONCLUSION

The MIS project represents an important advance in the development of modern management practices in one of Egypt's largest and most successful companies. As such it offers benefits not only to Arab Contractors but also to those companies who are willing to learn from the experience of others. Before these benefits can be fully realised, however, it is vital that the project is continued and developed. Successful implementation will demonstrate the validity of the work already done.

Finally, we would like to thank the staff of Arab Contractors, UNIDO, and UNDP who have assisted us in our task. In particular, we thank the other members of the MIS project team for their contribution towards making this assignment both memorable and enjoyable.

for URWICK INTERNATIONAL LIMITED

*D H Tucker*

D. H. Tucker



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