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MANUAL
ON
THE USE OF
CONSULTANTS
IN
DEVELOPING
COUNTRIES

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consultants in some countries, as well as a selected list of consulting associations, may be found in Annex 2.

Chapter 4, dealing with contracting procedures, covers the essential points to be included in written agreements between clients and consultants, and contains a summary checklist of contract provisions. Various types of contract forms selected for the purpose of illustration appear in Annex 3.

Chapter 5 begins with a discussion of the various cost factors involved in undertaking a consulting assignment, and goes on to review the different systems which have developed for the remuneration of consultants. Illustrative case material on fee scales adopted by consulting associations in several countries is included in Annex 3.

The role of consultant and client in undertaking an assignment, and their responsibilities for ensuring the successful completion of a project are discussed in Chapter 6. Since both client and consultant must evaluate an assignment on completion, a section of this chapter deals with evaluation procedures.

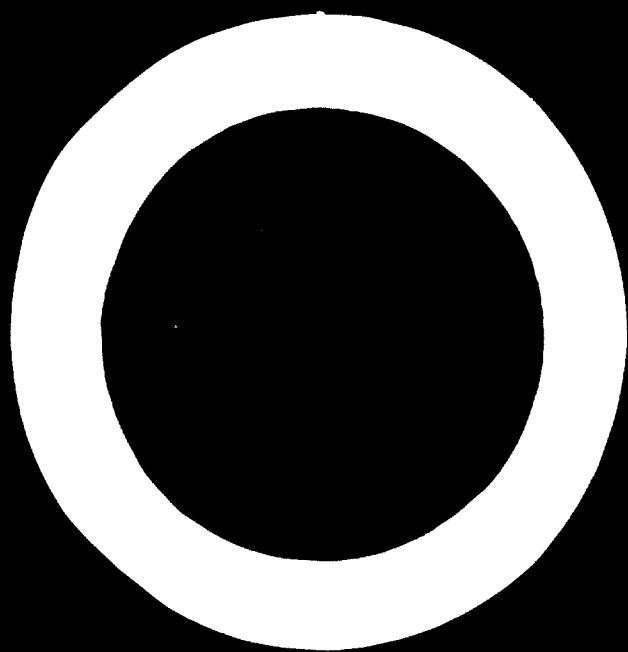
Chapter 7 deals essentially with the development of the local consulting profession in developing countries. Special attention has been paid to questions relating to training and remuneration, and to the importance of creating a proper professional environment; the types of assistance which should be considered in the establishment of local consulting activities are also carefully reviewed.

For the purposes of this Manual, the types of assistance provided by industrial consultants have been divided into five functional classifications which are reviewed in Chapters 8 through 12, and case studies are presented, illustrating the role of consultants in undertaking some of these activities.

Since many of the topics under review in this report are interrelated, a certain amount of repetition has been unavoidable. Any questions pertaining to the Manual, as well as comments, criticisms and suggestions may be addressed to :

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This second printing is identical with the original edition published in 1968, except that the opportunity has been taken to bring some of the material in the Annexes up to date.



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CHAPTER 1

The role of the consultant

THE PROCESS OF social and economic growth in countries at various stages of development raises many complex problems whose solution requires a wide diversity of skills and talents. Because of the urgent need for rapid economic growth, organizations in developing countries may supplement their limited resources of trained manpower by availing themselves of the specialized know-how of consultants.

The services of consultants may be utilized by the government or special sectors of the government, by large industrial enterprises, financial establishments, service industries, public utilities, and other institutions that have to do with the industrial development of a country.

In highly industrialized countries, the use of consultants has increased considerably during the past four decades, and particularly since the Second World War. Consultants have contributed greatly to the progress of the economies of the industrial nations, and have provided a valuable reservoir of skills and experience to supplement the internal resources of industrial organizations and government agencies. They are recognized as excellent agents for obtaining advice and performing specific tasks, for no firm or official institution has a staff sufficiently qualified to find the best solutions to all problems on a flexible basis.

It is to be noted, moreover, that in the industrial countries consultants are mostly used, besides the government, by the more rapidly growing firms. In fact, the judicious use of consulting services seems to be associated with growth and expansion, and is undoubtedly an important aid to development.

It is of no small significance, therefore, that local sources of consultative help are becoming available in many developing countries and that those services are likely to expand with time. For, as the economies of these countries develop and their need for outside assistance grows, the practice of engaging and utilizing local consultants will undoubtedly follow the trends set in the highly industrialized nations.

The types of outside assistance available, the conditions under which they may be obtained, and the relationships necessary to ensure maximum benefits will be discussed in detail in subsequent chapters.

REASONS FOR USING CONSULTANTS

The main reasons for using outside consultants are more or less the same both in the developing and the developed countries. The kinds of specialized services needed, and the extent to which particular services can be used effectively, vary with the environment in which the client is located. Similarly, the availability of outside advisers, the cost of their services and many other details of the consulting relationship differ greatly. But the fundamental idea of bringing outsiders into a client firm or organization on a temporary, contractual basis to render research and advisory services has many inherent advantages which have a direct influence on industrialization and economic development. These advantages are:

The possibility of shortening the time needed for the implementation of projects

Consultants may accelerate the application of technical, economic, and managerial skills to the solution of practical problems. In particular, consultants can diminish the time required to get new undertakings into operation by providing information necessary for the rapid implementation of plans.

The possibility of obtaining specialized skills and know-how

Consultants provide a ready source of skills, knowledge or expertise which are not available in the client organization. Indeed, certain types of design, organizational planning, systems installation and market feasibility problems are not frequent enough to warrant the use of permanent staff having the necessary ability to study these problems. In this regard, consultants can be particularly helpful to small and medium-sized firms which cannot afford to employ a wide range of specialists, technicians or professionals on a permanent basis. Even though final decision as to what should be done always rests, and should rest, with the client organization, the task of analysing alternatives and preparing recommendations may be contracted to outside specialists.

Not only do outside consultants provide fresh skills, but they are frequently backed up by other senior specialists and extensive research facilities, which can be invaluable in carrying out a particular project. It is indeed sometimes necessary that a question should be studied by a team of specialists in various branches. In such cases, consulting organizations can generally rapidly assemble a number of professionals with a variety of skills.

The possibility of finding a fresh approach to established practices

Even though the technical skills of a consultant may duplicate those already available within the client organization, he can still render extremely valuable services. This is true mainly because the consultant is an outsider. As a newcomer to the organization, he can readily see the problems, wastes and inefficiencies to which his clients have become inured. The consultant is trained to ask questions and to focus his attention on blind spots. His new approach enables him also to discover solutions and opportunities that had been previously overlooked.

Furthermore, the consultant, being an outsider, usually has a unique opportunity of concentrating on fundamental problems and preparing future plans without being distracted by daily routine.

The possibility of obtaining independent evaluations and recommendations

An outside consultant can usually give unbiased opinions and provide objective evaluations of a particular problem, since he is not so hampered by the internal politics and loyalties within the organization. Indeed, an observant consultant becomes a sort of internal arbitrator in methods and techniques. Further, he can, when appropriate, apply the ideas and approaches adopted in one country or industry to the problem which has to be solved.

Moreover, the independent judgement and experience of a respected outsider may serve to confirm the soundness of the methods adopted. The outsider's role may help to settle disputes or enlist the support of third parties. Bankers, for example, are liable to accept more readily feasibility studies and prospectuses prepared by recognized independent consultants than by those prepared internally.

TYPES OF CONSULTING ASSISTANCE AVAILABLE

Industrial consultants provide different types and forms of services. These may range from direct assistance to the government in establishing the criteria, objectives, priorities and procedures for an integrated industrial development plan to specific technical assistance to an industrial enterprise within the country. In the present report, the types of assistance which industrial consultants can render are divided into five functional classifications. They are discussed briefly below, and in greater detail in Chapters 8 through 12. Relevant case studies to illustrate the role of consultants in carrying out specific types of projects are to be found in Annex 1.

DESIGN AND ENGINEERING SERVICES

The design and engineering services necessary for the establishment of an industrial plant or project may include project feasibility studies, plant

design and preparation of the books of tender for equipment and civil engineering, evaluation of bids, supervision of erection and start-up as well as assistance in the initial operation.

TECHNOLOGICAL SERVICES

Consultants frequently explore and examine the natural resources that exist within a country. Studies may be made to find out what raw materials are available and how far they are suitable to specific uses by means of laboratory tests and analyses. The consultant may develop and improve the application of technical know-how in industrial projects, and conduct specialized research in product development including design, packaging, new uses, and the utilization of wastes. Consultants may also evaluate and improve production methods and processes, plant layout, equipment design and specifications, and assist in establishing industrial plant regulations and codes, including construction standards and safety facilities.

ECONOMIC SERVICES

The economic services of consultants cover development planning and surveys of economic and industrial potential. These include specific industry surveys, project analyses and bankability studies, as well as the study of the investment climate and a review of industrial and economic institutions with a view to stimulating investment in industry.

MANAGEMENT SERVICES

Consultants may be engaged to review and evaluate the objectives and goals of a particular project. They may undertake management surveys, introduce production planning and control schemes at the plant level, conduct operations research, inventory control, quality control, materials handling, product and cost accounting, and corporate planning; they may also review management and personnel planning, cost accounting and electronic data processing and introduce a multitude of other systems and controls into an operation.

TRAINING PROGRAMMES

Consultants frequently undertake to train the local labour force so that the latter may take over and operate the equipment after the consultant's assignment is finished. Thus, the consultant may set up and administer local training centres and in-plant training programmes for engineers and technicians, and give advice on the long-term training plans.

Sources of consulting services

THE SOURCES OF professional consulting services are many. Some individuals or organizations mostly render consultative services only, while others provide consultation as part of their vast range of activities. The various sources of consultative services are: individual consultants, consulting firms, industrial research institutes, universities, government agencies, foreign governments and international organizations. There are also secondary sources, such as suppliers of equipment, materials or proprietary information and integrated engineering organizations.

In countries which are in the initial stages of industrial development, there are few local consultants or consulting organizations. Hence, these countries must necessarily rely on the services of the consulting profession from the more industrially advanced countries. But as the professional ability of the local consultant grows, his services, too, will be increasingly helpful, for local consultants know more about conditions prevailing at home and are more readily available to meet the needs of their respective countries.

Furthermore, they may have access to foreign sources of assistance which can supplement their own skills and experience. Another consideration is that, in handling assignments, particularly smaller projects, it is frequently inconvenient and expensive to obtain assistance from foreign sources. This applies especially to small and medium-size companies.

TYPES OF CONSULTANTS

THE INDIVIDUAL CONSULTANT

The classic example of an individual practitioner is that of a professional man of recognized experience and ability who offers consulting services in one or more branches of activity. He may supervise the con-

struction of certain types of plants or facilities, or be an authority on the techno-economic aspects of certain sectors of industry, or again be a leading expert in some aspects of management. Frequently, he is a man of vast experience in his particular branch and his name is likely to be among the first that come to mind, at least in the general geographical area in which he lives, whenever a particular problem arises. It often happens, however, that he works in association with other consultants or organizations on assignments for which they are primarily responsible. His reputation and standing are largely due to the success of the projects he has undertaken.

Many university faculty members serve as part-time consultants. They may accept longer assignments during vacation periods, sabbatical years, or on leaves of absence. Like full-time consultants, the university men may collaborate with other consultants or consulting organizations.

CONSULTING FIRMS

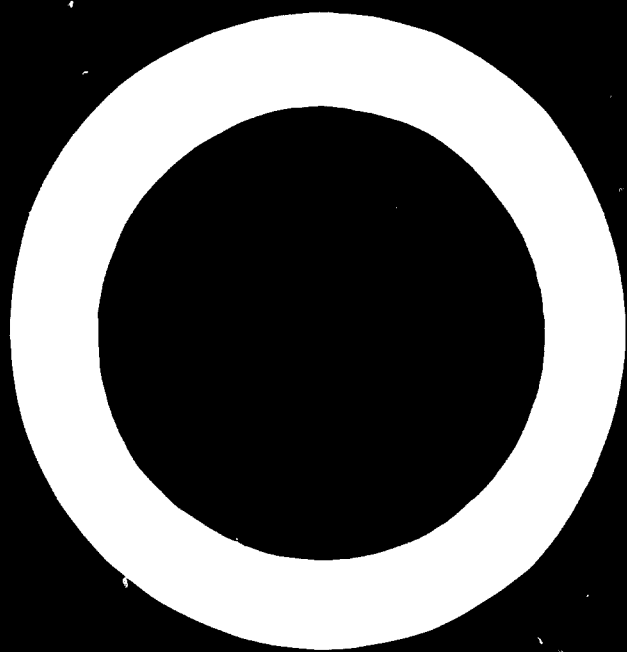
The factors that have influenced the setting up of consulting organizations include the rapid advance and complexity of science and technology and the economic implications of large-scale operations. Many individual consultants find that their assignments call for expertise in fields other than their own, and that the task can be carried out satisfactorily only by direct collaboration with other specialists. A team is thus assembled and a partnership or company is organized. In terms of size, consulting groups may be divided into two main categories:

(a) The small partnership or company established by a few experts, whose specialities complement each other but cover a comparatively narrow area within a particular discipline;

(b) The medium-sized or large corporation, which employs a large staff of professionals, specialists and general service workers, and often maintains, in addition to the home office, sub-offices in different areas.

The distinction between the small organization and the medium- or large-sized one is not so much one of kind as of degree. The pattern of operation is generally similar, but the organization and administrative procedures of the larger firm tend to be more formalized. As a rule, the larger group offers a greater number and diversity of professional personnel and a wider spectrum of services than the smaller unit.

The number of consulting organizations is growing quite rapidly in industrialized countries and to a lesser extent in developing nations. The services offered cover most areas of engineering, research and development, management, economics and socio-economics. Some organizations, according to their specialities, maintain laboratories and other facilities for carrying out necessary investigations, while others sub-contract some of their assignments to other firms or individuals.



INDUSTRIAL RESEARCH INSTITUTES

Industrial research institutes provide investigative services in industrial technology and engineering and often in economics and socio-economics as well. The use of this type of institution for the purpose of seeking solutions to practical problems has gained increasing popularity in the developing countries. This was strongly evidenced by participants from developing countries at the United Nations Inter-Regional Seminar on Industrial Research and Development Institutes in Developing Countries, held in Beirut in December 1964.

Like the other organizations discussed earlier, industrial research institutes vary as to size, areas of specialization, and legal status. Those commonly described as "specialized" provide services mainly for the benefit of one industry or product (such as steel), or a group of related industries or products (such as building materials, food products, etc.), or again they may be specialized in the sense that they operate in one or a few scientific branches.

On the other hand, "multi-purpose" institutes are usually equipped to handle problems in a wide variety of fields, industries, products or scientific disciplines. Generally speaking, multi-purpose institutes are suited to the needs of developing countries. They are staffed by a pool of professional workers of different backgrounds whose collective talents can be usefully employed to solve a particular problem, and thus allow a fuller utilization of available technical resources for the solution of the multifarious problems of development.

Research institutes may offer consultative help in one or more of the following: technology, engineering, economics, finance, and management. They may also provide information services, technical services, and techno-economic services. Among the technical services must be mentioned assistance in the formulation of production standards and specifications, product and process development, evaluation of equipment, quality control, design engineering, product improvement, and *ad hoc* technical trouble-shooting.

The services of a techno-economic character include project feasibility studies, marketing studies (including advice on such matters as packaging, labelling and branding of products, etc.) as well as assistance in long-range forecasting, raw materials surveys, productivity studies and many others.

In addition to their consultative services, research institutes may provide a wide range of routine services such as the dissemination of technological and scientific information, general laboratory testing and analyses, patent development and licensing assistance, the formulation and execution of training schemes and the introduction and adaptation of foreign technology.

Many developing countries have at least one industrial research institute, and some of them have several. In most developing countries, the research institute is directly or indirectly sponsored and financed by the government, but there are also institutes founded by private organizations with or without financial support from the government. Often, institutes in developing countries are equipped with up-to-date research and testing laboratories and pilot-plant facilities.

UNIVERSITIES

In some countries, universities have begun to accept consulting agreements, and some of them have set up contracting offices to handle the administrative work. As a matter of policy, they generally try to deal with basic research projects and sometimes establish a research institute for that purpose. University groups may also participate in socio-economic development activities such as resource surveys, educational projects, management training courses, and the like.

GOVERNMENT AGENCIES

In both developed and developing countries, government agencies responsible for technical, economic and social development offer various services to industry. These agencies are normally staffed by highly trained professional and technical people whose advice or expert opinion can contribute to the solution of development problems in a significant manner. While these staff members normally have specific responsibilities within their own organizations, they are often available for consultation to other organizations, agencies and/or business enterprises. These individuals cannot be considered as consultants *per se*. Generally, no fee is charged and they are not contracted to carry out specific services for a particular client. They do provide, however, some of the types of assistance provided by consultants.

Among the governmental development agencies and similar organizations which provide services to industry are:

- (a) Ministries of industry and similar ministries and departments ;
- (b) Planning organizations ;
- (c) Central or regional statistical offices ;
- (d) Industrial research institutes ;
- (e) Management guidance or productivity centres ;
- (f) Industrial development corporations ;
- (g) Industrial development banks ;
- (h) National corporations.

As a group, the above agencies generally contain an impressive reservoir of professional talent and expertise. Among the officials of these agencies, one normally finds engineers, technologists, economists, scientists, management specialists, bankers, lawyers, financial experts, statisticians, etc.

Some of the above agencies, such as industrial development corporations, have set up special technical assistance departments in order to systematize their programmes of advisory assistance to their clients.

FOREIGN GOVERNMENTS AND INTERNATIONAL ORGANIZATIONS

There are numerous programmes of technical assistance to developing countries sponsored by various foreign governments and international organizations on a bilateral, multilateral or international basis. These programmes often necessitate the recruitment of individual consultants, groups of consultants, or consulting organizations by the sponsoring government or international body to carry out the work involved. Very frequently, the agreements between the parties impose certain counterpart obligations on the local government, which accepts to supply personnel and to defray the local cost of the project. The Special Industrial Services Programme of the United Nations Industrial Development Organization (UNIDO) provides this type of assistance.

SECONDARY SOURCES OF CONSULTATIVE SERVICES

The groups listed below are not, strictly speaking, professional consultants, but they may provide certain consulting services.

- (a) Vendors of equipment ;
- (b) Suppliers of materials ;
- (c) Suppliers of proprietary information ;
- (d) Engineering designers/constructors.

When using these suppliers, the client must bear in mind their inherent self-interest. The main reason for which they offer their services is to secure customers for their products or proprietary information.

(a) Vendors of equipment. Suppliers of equipment and apparatus are usually prepared to spend a reasonable amount of time and technical effort to demonstrate to a customer that their machinery will do his job effectively and economically. However, there are limits to what they can afford to do without charge, and they usually undertake extensive demon-

stration work on a cost-recovery basis. For example, they may lease an experimental machine and provide expert supervision at cost for a trial period so that the customer may form an estimate of its utility at his plant, or else they may carry out the study in their own facilities for a toll charge.

The client may contact outside firms whenever such firms can supply certain types of assistance which the consultant cannot supply. An equipment supplier may agree to supply the know-how, the design, the equipment and even participate in the equity capital. In addition, he may supply key operators and even managers and engineers for a period of several years.

(b) Suppliers of materials. Agents or manufacturers of materials such as dye stuffs or components may provide information on the use of their products as part of their marketing service to customers. If the amount of assistance or advice required turns out to be larger than usual, arrangements may be made to extend the services to be rendered in return for the payment of a fee.

(c) Suppliers of proprietary information. Manufacturing companies frequently make arrangements with purchasers of proprietary know-how or patent rights to have some of their technical personnel assist in handing over and applying the information in question. This point may be included in the license agreement or be covered by a separate know-how agreement.

In addition, consulting services, including studies, specifications, designs, and know-how may be obtained from an established manufacturer when obtaining a license for a popular trademark or brand name. This applies to consumer items (soaps, food products and phonograph records, for example) rather than intermediary industrial products. Such an arrangement is quite usual when the client has been the manufacturer's agent for some years and intends to branch out into manufacturing. It has the added advantage that the client may receive training details about the manufacturing process in the plant of the manufacturer issuing the license. Firms which have a number of foreign licensees service them through regional offices.

In some instances, a manufacturer may extend consultative services to a client in a developing country in order to assist in the extraction or processing of raw materials which he wishes to purchase. Agreements may also stipulate that these services will be paid for in kind. This is true of such material resources as timber, ores, minerals, hides, etc.

(d) Engineering designers/constructors. One form of consultative assistance to developing countries is the so-called "turn-key" or "package" project, in which both the engineering and construction work in connexion with a project are contracted to a single engineering constructor or equipment supplier, who may in turn sub-contract to other organizations. Such work may include a feasibility study, field investigations, planning, designing, specification of equipment and facilities, and construc-

tion. These projects are usually undertaken only after preliminary technical and economic studies and reports have been prepared.

The design and construction of manufacturing plants are often carried out in this manner, and many large consulting organizations with varying degrees of specialization undertake such assignments. After the feasibility study has proved the soundness of the project, the engineer proceeds to execute the detailed design. His background experience with similar types of facilities gives him an advantage.

In some countries, combined engineering and construction contracts are contrary to professional engineering practices and are usually not recommended. Traditionally, the "consulting engineer" is an agent of the client. In his professional capacity, he inspects and supervises the construction work and safeguards his client's interest during the period of construction. He also interprets the plans and specifications and acts as an arbitrator of disputes between client and construction contractor.

On the other hand, under a combined engineering and construction contract, the "engineering constructor" is automatically placed in a position of partnership with the contractor. He may also have a financial interest in the outcome of the contract. When a combined engineering and construction contract seems appropriate, either because of the client's preference or the customs of the country in which the work is to be performed, the engineer employed by the construction contractor must nevertheless be guided by the principles of engineering practice and professional ethics in performing his duties.

The selection of consultants

THE CHOICE OF the right consultant, having the training, experience, capabilities and the specific qualifications required to carry out a project successfully and economically, lies with the client organization. It is important that guidelines be established for the selection of consultants, whether for one particular project or for all projects which require the services of consultants. Though no one system or procedure for selecting consultants can apply to all types of clients and projects, there are four important steps to be taken before the actual process of selection, namely :

- Appointment of a project co-ordinator or committee ;
- Definition of the problem ;
- Establishment of regulations pertaining to the award of contracts ;
- Preparation of lists of consultants.

When these four steps have been completed, several different procedures may then be used for the final selection of a consultant.

INTERNAL PREPARATION BEFORE THE SELECTION OF CONSULTANTS

APPOINTMENT OF A PROJECT CO-ORDINATOR OR COMMITTEE

Once the client organization has established that a consultant is needed, it should appoint an individual or committee from the organization who will be primarily responsible for getting into touch and negotiating with

consultants and subsequently serve as a liaison agent with the consultant. The project co-ordinator or the members of the committee, as the case may be, should be selected on the basis of his or their knowledge of the type of project to be carried out and their previous experience with consultants. When a new company is being established and requires the services of consultants, it is the Board of founders or directors which is often responsible for the selection process.

DEFINITION OF THE PROBLEM

Before contacting consultants, the client organization should identify and clearly define the problem or project in question and assess the means that are available for solving it. In theory, this would require a comprehensive description of the proposed project, indicating the purpose to be served, the availability of funds, the completion date, and all other factors pertaining to the project. In some types of consulting activities, however, particularly in the field of management, such details cannot be provided and only the desired objectives of a study can be indicated. Sometimes the client's initial proposed assignment is not really what should be undertaken. For instance, the client may propose the building of a plant, without having examined in detail all the factors which bear on its technical and economic success. In such cases, a feasibility study would be necessary before proceeding with the actual execution. On the other hand, the request may call for the design of a piece of equipment or a process step, when actually it is the entire operation which needs to be reviewed. This review may warrant radical changes in the original concept.

When the scope of the assignment entails a considerable amount of work, a consultant is sometimes engaged to prepare a preliminary report or prospectus. The client may receive good value for the fees he pays by having the problem clarified, even though the particular consultant may not carry out the assignment. In the case of a large project, several consultants may provide a preliminary prospectus. The client may then evaluate the merits of different methods of defining the problem and executing the project.

The client should provide prospective consultants with the exact terms of reference, so that consultants fully understand the problem and are in a position to prepare a precise work programme. The terms of reference should state the background of the problem and the scope of the project, and contain a list of the services required, the necessary field surveys, a list of available information, and a list of previous studies carried out. A concise statement of these terms will ensure that all proposals submitted for a particular project are comparable.

ESTABLISHMENT OF REGULATIONS PERTAINING TO THE AWARD OF CONTRACTS

The selection of consultants may be subject to certain administrative regulations. Official government agencies responsible for industrial development or the establishment of specific industries of the public sector, such as steel mills, petroleum refineries and petrochemical plants, must frequently comply with general financial and administrative rules established by the government.¹

In some cases, these regulations define or limit the method of selection. For example, some countries require closed competitive bidding for the selection of consultants. This procedure is discussed at length below.

The regulations mentioned above sometimes expressly stipulate that consultants who have any direct or indirect relation whatsoever to sellers or equipment manufacturers may not be considered. As a rule private firms are not subject to such limitations. However, they may require an authorization to use foreign experts or have to obtain government permission to get the necessary foreign exchange to pay their consultants.

PREPARATION OF LISTS OF CONSULTANTS

There are a number of procedures which the client may follow to prepare a list of consulting organizations capable of executing a project. If the client has had considerable experience with consultants, the selection process is very much easier.

Very often, international consulting firms contact the client themselves. Consultants learn of potential business opportunities through their local business representatives, foreign consulates or embassies, contacts in ministries and other official bodies, or by carefully reviewing official government gazettes and specialized international periodicals and newspapers. From these information sources, consultants follow the development of a particular project and it is not uncommon for them to pay courtesy calls on the client.

In a number of developing countries, national agencies such as national planning boards, industrial development agencies and the like have established rosters of consultants. The consultants included in such rosters have generally been evaluated on the basis of their legal and financial status, the branch or branches of their activity and experience, including overseas experience, the professional staff they have and their qualifications, and the references they have produced. Whenever the services of a consultant are required, the interested parties consult the roster.

¹ A digest of the "Regulations governing the activities of foreign engineering consultants in some Middle Eastern countries" is included in Annex 2 to illustrate the types of regulations which exist in several countries.

In the preparation of a list of consultants to be contacted, the client may wish to locate consultants who are not already known to him in one of the following ways. He may contact :

- (a) Organizations active in international development ;
- (b) Commercial attachés and embassies of industrial countries ;
- (c) Professional consulting associations (a list of which is included in Annex 2).

The inclusion of a consultant's name on such lists should not be interpreted as an endorsement of the consultant by the organization or agency providing the list. The scope of these lists varies considerably, and the client may wish to write to a number of consultants for brochures and a general description of their activities, in order to select an initial group of consultants he might contact about the specific project.

Sometimes, the governments of developing countries use the same procedures for securing consulting services as they use for the purchase or procurement of equipment. They obtain offers from consultants by advertising a specific project in local and specialized foreign newspapers and periodicals. Interested consultants are instructed to contact the client organization for further information.

SELECTION AND EVALUATION OF CONSULTANTS

After the client has secured a list of consultants, he may proceed with the next two important steps before actual selection, namely, preliminary screening and negotiation, and call for tenders. The following discussion is based on the assumption that the preliminary steps listed earlier in this chapter have been carried out.

A number of important factors should be taken into account in assessing whether prospective consultants are suitable. Though some of these criteria are obvious and well known, it is useful to recapitulate them here :

- (a) The consultant's approach to the problem ;
- (b) His experience and background with respect to the project and services performed in the execution of past projects ;
- (c) His experience in carrying out similar projects in developing countries ;
- (d) The personnel to be assigned to the project and their professional qualifications, language skills, specific knowledge of the country, and experience with the consulting organization ;

(e) The background of the consulting organization, taking into consideration factors such as financial standing, number of years in operation, scale of operations, range of services, types of clients and list of projects, size of professional staff and their qualifications, and in-house capabilities such as laboratory and testing facilities or access to such facilities necessary for undertaking a specific project ;

(f) The reputation of the consulting organization based on depth reference checks ;

(g) Fees ;

(h) Duration.

It is wise policy to examine each consultant's approach to the problem carefully, and analyse his understanding of the project and of the problems to be solved as well as the manner in which he proposes to carry out the assignment. The client should determine if the consultant's approach is realistic, having regard to the statistical data available, transportation and port facilities, supply of skilled labour, trained technicians and management personnel, location and supply of raw materials and similar factors which must be taken into account in carrying out industrial projects.

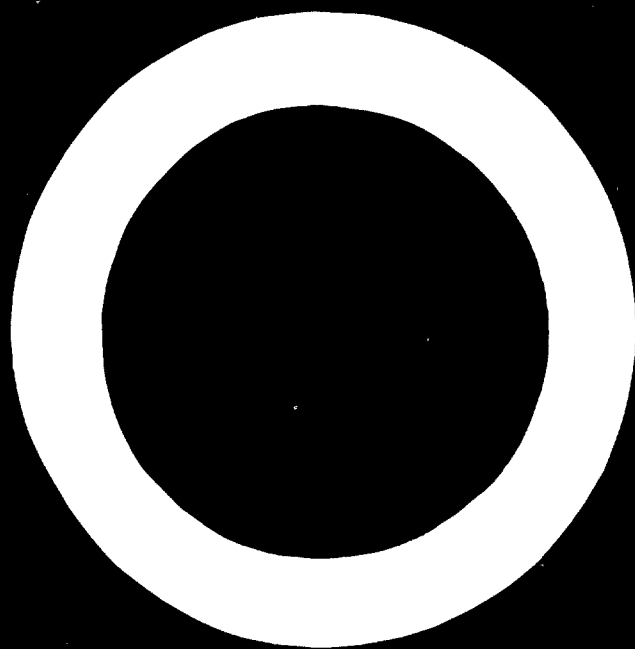
Moreover, the client will be protecting his own interests if he takes the time and trouble to investigate the reputation and financial standing of a prospective consultant. Previous clients of the consultant can provide information on his experience and performance. The client also may wish to look into the experience acquired by the consultant in other developing countries.

PRELIMINARY SCREENING AND NEGOTIATION

Certain professional engineering consulting associations and management consulting associations in the developed countries have prepared information pamphlets recommending procedures for the selection of consultants. The outline given below takes these recommendations into consideration. The actual steps to be followed may vary considerably according to the client, the type and size of the project, and the relative location of the client and the consultant.

1. Preliminary screening of consultants

Once a list of consultants has been obtained, the merits of each consultant are examined in the light of his professional abilities and the services he has performed. If necessary, further information may be obtained by writing to consultants for brochures. On the basis of all available information, one or more consultants may be selected for preliminary talks.



2. Establishment of preliminary contact

At this stage, the project co-ordinator or committee should write to the consultants selected, describing the project and type of assistance sought, so that they may say whether they are interested and available. At the same time, it is advisable to ask them to give details on their organization and the branches in which they are specialized and to provide lists of references acquainted with their performance on prior assignments. This supplements similar information which may have been obtained earlier. It sometimes happens that consultants are unable to provide the required services themselves and recommend other consultants.

3. Second screening of potential consultants

On the basis of the replies received, the project co-ordinator or committee can decide which consultants meet the requirements for the particular assignment. The subsequent screening should be made only after a thorough study of the replies and a review of the job description and criteria for successful consulting performance.

4. Exploration of the problem in detail and request for proposals

The client is now in a position to discuss the project in detail with several consultants and examine their qualifications and references thoroughly. As a result of their discussions and correspondence, the client and one or more consultants establish the terms of reference which the proposals should cover. On the basis of this preliminary exploration, the client may select several consultants and ask them to submit proposals.

The preparation of proposals requires a considerable amount of time and money and the client should not request a proposal unless he is interested in a particular consultant. The consultant may have to define the scope of the project anew or undertake preliminary investigations for the client to use the proposal made by one consultant as a basis for discussion with another, unless of course the client has the prior approval of the consultant.

5. Choice of one or more consultants for negotiation

The client can now make a first and a second choice based on each consultant's approach to the problem and a careful review of his merits in the light of the criteria established for evaluating consultants.

6. Negotiation of fees

At this stage, the client and the consultant selected as the first choice negotiate the details of the project and the fees. If they cannot reach an agreement, the negotiation is resumed with the second consultant chosen and so on down the line until an agreement is reached.

CALL FOR TENDERS

Normally there are two ways of contacting consultants under this system. The call for tender is either sent or made available to a select group of consultants who are already known to the client or chosen from an established roster, or it is made public and consultants are invited to submit proposals.

The call for tender usually includes a detailed description of the project and specifies the exact terms of reference which the consultant's offer is to cover. It may mention the proposed method for carrying out the project, the time it will take, the cost of the work outlined, and the number and qualifications of the consultant's staff who are to work on the project.

The call for tender specifies the date when proposals are to be submitted to the client. There may be little or no contact between the consultant and the client after the issue of the call for tender, though the consultant may write for more information or clarification, or undertake preliminary investigations of his own for which he may require the assistance of the prospective client. If the client's instructions in the call for tender so require, the consultant may have to include a price quotation in his proposal. In cases where a price quotation is required, the method of tendering is referred to as competitive bidding.

COMPETITIVE BIDDING

A number of clients in developing countries, in particular governments, prefer some form of competitive bidding and sometimes insist upon it. Many public agencies and private companies have adopted for the selection of consultants the same system of closed competitive bidding as they use for procuring equipment. In such cases, consultants are requested to quote a fixed price in their proposal to a prospective client. The consultant may even be requested to provide a bank guarantee at the time he makes his bid. This is to ensure that he will stand by his offer in the event he is chosen.

In a number of countries, the codes of ethics of the associations of consulting engineers prohibit competitive bidding and the payment of

guarantees. They stipulate that the consultant should be selected on the basis of his qualifications and that fees should be negotiated afterwards. Competition for work on the basis of price is as repugnant to professional engineers as it is to members of the legal or medical professions.

That being so, owing to the types of regulations which exist in the developing countries, many associations of engineers recognize that they must adopt a flexible attitude. For example, the following policy statement has been adopted by the American Society of Civil Engineers:

“On foreign engineering work, for which only United States engineering firms are to be considered, a member shall order his practice in accordance with the ASCE Code of Ethics. On other engineering works in a foreign country he may adapt his conduct according to the professional standards and customs of that country, but shall adhere as closely as practicable to the principles of this Code.”²

It should be noted that the codes of ethics of many management consultant associations are not rigid on this point.

In the developing countries, where capital and foreign exchange are in short supply and considerable importance is attached to the allocation of scarce resources, it is obvious that the question of fees is a major concern in the selection of consultants. However, professional services cannot be judged solely by their cost. When the client organization seeks competitive bids from consultants, it should specify that it is not bound to select the lowest bidder. In the final selection, each proposal should be carefully weighed in the light of the nature of the problem, the proposed approach to its solution, the probable benefits to be derived, the cost involved and the particular experience and ability of each consultant to execute the project. As in any other professional services, the paramount consideration in consulting services is the result. A good job is well worth the cost and a poor one is a loss, regardless of price. Moreover, the cost of engineering services seldom amounts, on the whole, to much more than 10 per cent of the project cost. A saving of even 10 per cent on engineering fees, therefore, means no more than one per cent of the project cost, and bad engineering could double the cost of a project.

TENDERING WITHOUT A PRICE QUOTATION

Under this system, the consultant is selected on the basis of the approach to the problem which has been outlined in the work programme

² American Society of Civil Engineers, 1966 *Official Register*, New York, p. 53, footnote.

submitted and other criteria. Fees are negotiated subsequently with reference to the work programme, the estimate of man-months and so forth. Often, the consultant is requested to submit his proposal, qualifications, etc. in one sealed envelope and his estimate of fees in a second. All proposals are considered, and those found suitable on the basis of the contents of the first envelope are selected and then re-examined in the light of the statement of fees in the second envelope.

Case study No. 1 of Annex 1 concerns a tender for advisory services for the distribution of liquid petroleum gas, and No. 2 concerns the selection of a consultant for the establishment of a cement plant.

Contracting procedures

THE RELATIONSHIP BETWEEN client and consultant should be clearly stated in writing before the actual work on a project has begun. The written agreement may be in the form of a letter of agreement or a formal contract. Management consultants generally prefer the former. On the other hand, formal contracts are usually used for consulting engineering and construction projects. Whichever form is used, those who negotiate an agreement should bear in mind that the responsibility for interpreting its terms may eventually pass to other persons. It is therefore essential that all points should be in writing.

The contract should be as brief as is consistent with absolute clarity. Excessive detail tends to obscure the salient points by dwelling on minutiae which may be confusing or contradictory.

Very often it is the consultant who prepares the first draft of the agreement. Since, as a rule, consulting contracts cover highly technical services, it is essential that the section describing the services to be performed, the sequence of work, the information to be supplied by the client and the terms of payment should be prepared by someone with a considerable knowledge of these matters. A comprehensive checklist of provisions to be considered for incorporation in contracts may be found at the end of this section.

Standard printed contract forms have been worked out by a number of government agencies, business firms and professional associations. Two model forms of contract and a sample letter of agreement are included in Annex 3 of this report.

The following discussion relates, in particular, to contracts concluded with consulting engineers. However, many of these points are included in the contractual agreements of management consultants as well.

ESSENTIAL POINTS IN CONTRACTS

Scope of the assignment. Successful consultant-client relationships depend on the proper definition of the assignment. The amount of detail neces-

sary for this purpose varies widely. In some cases, such as a continuing advisory service, the description may be quite brief, while in others, such as the specifications for a large installation, lengthy descriptions may be required. These details may be incorporated in appendices to the contract with the stipulation that they form an integral part of the agreement.

Definition of the scope in successive phases. When the contract covers a number of successive phases of a project, the scope, estimated time for completion, and fee arrangement for each phase should be outlined in detail. It may not be possible to prepare a contract covering the complete project because the services called for in later phases cannot be foreseen with reasonable accuracy, that is to say, not until the information based on the completion of the earlier stages becomes available. In such cases, the contract may cover only the first phase. If it is expected that the consultant will undertake later stages, it is good practice to describe these stages in the contract in conditional terms, without making them binding. It is advisable to give a preliminary estimate of their probable cost and duration, where possible, with suitable wording to show that these estimates will not constitute a firm agreement until the necessary information is available.

Change of scope. Both client and consultant, but particularly the latter, should be alert to any appreciable changes in the character and extent of the work during the course of an assignment. Indeed, these may be of sufficient magnitude to call for alterations in the obligations assumed, and provision should be made for such changes in the contract. Increases or decreases in the rate or amount of effort on the part of the consultant, not provided for in the original agreement, should, as soon as possible, form the subject of an amendment reflecting the change. Otherwise, disagreements might arise after a considerable change in the work pattern has taken place.

Changes of scope resulting from unforeseen economic or technical developments are unavoidable. However, some unnecessary changes may be avoided if the decisions concerning successive phases are taken when each preceding phase has been completed.

Assignment of responsible personnel. It is advisable to designate two persons, one from the client and one from the consulting organization, to be directly responsible for policy decisions regarding the fulfilment of the contract provisions. Preferably, they should have been present at the discussions leading to the contract. Thus, they will be fully informed of the background of the agreement.

It is customary for the client and the consultant to supply the names of their official project representatives through an exchange of letters. In addition, the client may require the consultant to indicate the names of those responsible for the day-to-day conduct of the work. However, it may be difficult for the consultant to specify the personnel to be assigned to a project unless the starting date of the assignment is known.

If any of the client's personnel have specific responsibilities for co-operation on a project, it is advisable to designate them also. The other

party should be notified of any changes in these assignments during the course of a project. Very often, the consultant is asked to give the name of the individuals who are to undertake an assignment and describe their qualifications. However, it is good practice to allow him some freedom in the selection of project personnel. The list of the persons he presents may therefore contain alternates. In fact, considerable leeway should be given the consultant in the assignment of personnel, as unforeseen circumstances may, in his judgement, necessitate the use of other specialists not included in the list. Such matters should be discussed with the project co-ordinator of the client and his agreement obtained.

Responsibility of the consultant. The amount of authority the consultant is to have vis-à-vis third parties should be stipulated in the contract. The consultant's position in relation to subcontractors, suppliers of equipment and other third parties, as well as in relation to the client's personnel who are to work with him or under his authority should be carefully defined.

The consultant may design the plant, choose equipment suppliers, and supervise the erection and installation of the plant. On the other hand, the consultant may have to consult his client before issuing certain instructions to third parties or be given complete authority over third parties and be entrusted with the supervision of their work.

Information to be supplied by the client. It is most important that the client should instruct his staff to supply the consultant with all relevant information freely, and not necessarily wait until it is asked for. The nature of the information and the manner in which it is to be disposed of should be stipulated in the contract after it has served its purpose. Ethical behaviour requires that such information be held in confidence by the consultant unless otherwise agreed.

Services and facilities to be provided by the client. Often, certain facilities are made available to the consultant by the client organization. The client may provide office space, clerical and technical personnel, transportation facilities, housing facilities and the like. To avoid future misunderstandings, it is advisable to specify all these in the contract. In addition, the intrinsic costs entailed should be accounted for in calculating the cost of consulting services.

Discussion and review. Contracts sometimes stipulate the schedule and extent of the meetings to be held between the representatives of the consultant and the client to review the progress of the work and confirm future plans. Constant exchange of ideas is important to maintain confidence and remove causes for misunderstanding before they have time to develop. In spite of the schedule, however, a representative should never be too busy to meet the other representatives to discuss an urgent matter.

Reporting. The schedule, number, language and type of reports to be submitted by the consultant should be specified. In the case of large projects involving successive phases, final reports are generally made at the end of each phase. In addition, the consultant should submit shorter

but more frequent progress reports to keep the client informed. The steps to be taken in the subsequent phase will be based on the recommendations formulated in such reports.

Term or duration. All consulting contracts should include a statement of the time during which they are to remain in effect. Provision must be made for modifying the original term, including the time limits within which requests for modification must be made by either party.

Renewal or extension. The method to be used for mutual agreement to extend or renew the contract may be specified in the provisions. The fee arrangements in cases of extension or renewal should also be stipulated.

Cancellation during course of the project. Contracts should specify the conditions under which either party may terminate the agreement, including the amount of advance notice required, provisions for suitable completion of the work in progress and the settlement of costs incurred by the consultant up to the time of the cessation of the work.

Copyright. As a rule, contracts specify whether the copyright of documents prepared by the consultant in connexion with the agreement rests with the consultant or the client.

Legal jurisdiction. If the client and the consultant are in areas in which different legal systems are in effect, the jurisdiction under which the terms of the contracts are to be construed should be specified. If the contract is drawn up in more than one language, it is good practice to state which language is the "ruling language" for purposes of the interpretation of the contract.

Financial arrangements. The type of fee, the length of time during which it is to apply and the method of payment should be stated for each successive stage of a project.³ It is important that the contract state the currency or currencies in which payment is to be made and the basis for currency conversion. If there are regulations limiting the transfer of money abroad, it is advisable to stipulate in the contract the obligation of both consultant and client to comply with these regulations. Many contracts contain a provision for the payment of interest on delayed payments. The tax liability of the consultant should likewise be stipulated.

Guarantee of performance. Contracts sometimes provide that the consultant must offer a guarantee to ensure that the assignment is completed in accordance with the initial definition. Such assurances are frequently provided by the execution of a performance bond through a mutually acceptable financial institution. These guarantees or bonds are usually not required in connexion with contracts for professional services in the industrialized countries, and a number of professional associations and consultants object to the inclusion of such provisions in contracts. In cases where a performance guarantee is required, an agreed statement of what constitutes successful completion should be included in the con-

³ The various types of fees are discussed in the next chapter.

tract. The guarantee usually amounts to a small percentage of the professional fees, though, in actual practice, reputable consultants usually exceed the required guarantee to fulfil their professional obligations and to safeguard their reputation.

Guarantee of payment. Similarly, the client may be requested to guarantee the availability of funds for the payment of the consultants' charges by means of a letter of credit or an escrow agreement.

Penalties. In exceptional circumstances, a contract may contain a clause penalizing the consultant for delay or deficiency in performance.

Arbitration. Formal provisions for handling disagreements between client and consultant by means of recognized arbitration procedures should be included in all agreements.

Special provisions for combined engineering and construction projects

Provisions which are ordinarily not apposite to consultative contracts may be included in contracts for "turn-key" projects. Under this system, the same organization not only provides engineering services but also undertakes construction. In such cases it is appropriate to require performance guarantees, since the consultant is acting as a contractor and the performance can be determined.

In some cases, the contractor is asked to assume responsibility for the regular operation of the facility at a guaranteed rate of performance. In order to do this, he must have full control over supervisory and operating personnel, raw materials, utilities, and specifications for finished products adequate for the performance under the terms of the guarantee. If he is not given full control over these, the possibility of performance at design capacity is a hazardous commitment on his part. Furthermore, the contract may provide that a bonus will be paid to an engineer-contractor for the completion of the project ahead of schedule, while a penalty may be assessed for delay in completion beyond the date specified in the agreement.

CHECKLIST OF CONTRACT PROVISIONS⁴

- (a) Date of agreement.
- (b) Identification of client and consultant, including transfer of responsibility to successors. If the client is a public body, the authority under which it acts and the source of available funds should be specified.
- (c) Review of the background and brief definition of the project.
- (d) Scope of the assignment, including reference to any detailed description incorporated in appendices.

⁴ This is a general list. All provisions may not apply in all cases.

- (e) Effective date of commencement of work, when different from (a), and estimated or stipulated time for completion.
- (f) Designation of individuals in client and consultant organizations responsible for policy decisions.

Responsibilities of the consultant :

- (g) Professional help, services, and information to be supplied.
- (h) Work schedule to be maintained.
- (i) Personnel to be supplied (may be detailed in appendix).
- (j) Availability for conference with the client.
- (k) Reporting, including the schedule, nature and language of reports.
- (l) Ownership of designs, blueprints, reports, etc., to be specified in the contract.
- (m) Safeguarding of information supplied by client.
- (n) Guarantee of performance, where required.

Responsibilities of the client :

- (o) Information, services, and facilities to be provided.
- (p) Availability for conference with the consultant.

Duration of contract :

- (q) Stipulation of termination, either by stating a specific date or by indicating the duration of the operation from the execution of the contract.
- (r) Provision and mechanism for the modification of the specified date by mutual agreement.
- (s) Provision for extension or renewal.
- (t) Provision and mechanism for early termination by either party.
- (u) Termination by reason of events beyond control of either party.
- (v) Provision against delays.

Financial provisions :

- (w) Total financial commitment by the client.
- (x) Method and schedule of billing by the consultant.
- (y) Method of payment.
- (z) Currency or currencies of payment and conversion rates.
- (aa) Guarantee of payment by the client.
- (bb) Payment of interest on delayed payments.

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VIENNA

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General provisions :

- (cc) Legal jurisdiction for the interpretation of the contract.
- (dd) Insurance provisions.
- (ee) Best efforts pledged by both consultant and client.
- (ff) Handling of disagreement through arbitration procedures.
- (gg) Obligations for visas, permits, licence fees and taxes.

SPECIAL AGREEMENTS : TRADE MARKS AND PROPRIETARY INFORMATION

Success in the installation of a new operation may depend on the use of information covered by a patent or proprietary know-how. It may be based on the use of a trade name, trade mark, or other form of trade franchise, of which a valuable element is the goodwill attached to the product or service offered.

Continuing licences. If the information to be used in a given country is covered by a patent in that country, a licence may be issued for the operation on payment of an agreed royalty. It may be stipulated that the licence will be revoked unless the royalty payments exceed a certain minimum, or unless, over a specified period, they average an agreed minimum.

The royalty may be fixed either at a flat rate or at a fee per unit, or again at a percentage of total sales or production. It may be on a sliding scale, decreasing progressively from a maximum at low sales volume to lower rates at specified increments of volume. The licence period generally runs for a stipulated number of years or for the life of the patent.

Paid-up licences. The licensee may prefer to buy the patent or technical know-how outright or by successive payments over a small number of years. He thus avoids having to continue payments during the life of the patent or information. As for the licensor, he gains by recovering royalties in a shorter period of time. In such cases, total payments will probably be less than those made for a continuing royalty. This is particularly true if the patented invention or proprietary know-how turns out to be very successful.

Mutual exchange of information. Since improvements on the original invention may be made by either the licensor or licensee, licences frequently provide that the new information obtained by either party, whether in the form of additional patents or proprietary know-how, shall be shared.

Licensing of proprietary information. In considering the introduction of new products or processes into developing countries from abroad under the present system of patent protection, one must bear in mind that the inventions may not be covered by patents valid in the particular developing

country. Hence the transfer of information and know-how comes under the general category of the licensing of proprietary information.

In highly developed countries, the negotiation of licences for proprietary information is less common than licensing under patents, though the latter type of licence may also provide for the transfer of more detailed information than that contained in the patent itself. One of the difficulties lies in defining the value of the know-how involved. In the case of a patent, there is a clearly stated legal ownership of rights, whereas the value of undisclosed know-how is more difficult to estimate.

The major reason for obtaining such information is to save time. In developing countries, the need to install a new process or product as rapidly as possible often makes it necessary to obtain the required information from a foreign source. Very often this information is provided in virtue of an agreement with an established firm in one of the developed countries. Sometimes such information may be provided by an engineering contractor, as an important part of the service he has to offer. When an outside engineering contractor is engaged to plan and construct a facility, he will normally have to provide process and product information as part of his assignment.

When such information is obtained from an industrial enterprise which has a wide experience in manufacturing a product or carrying out a process, arrangements may be made so that it assists the client in installing the plant itself. This may be done in the form of a joint venture with the provision that the manufacturer's information and expertise is recognized as part of his contribution to the capital assets of the undertaking.

Franchise agreements. The reputation enjoyed by a well-established trade mark or other brand identification, particularly for consumer products, may be an important factor in the success of a proposed venture. Many companies with such assets of goodwill are prepared to extend their activities to other countries. Examples are to be found in trade mark items such as food products, cosmetics and toiletries, beverages, household equipment, petroleum products, electrical devices, automobiles, and so forth.

These companies often feel that, in order to maintain the quality necessary to protect the value of their franchise, they must be responsible for the technical supervision and quality control of the new operation. This may be accomplished through establishment of an agency relationship or a joint venture.

Consulting fees

A NUMBER OF DIFFERENT systems have been developed for the remuneration of consultants. The system selected for a specific project or stage of a project will depend on preferences and circumstances.

It is important that the arrangements regarding the fees to be paid should be carefully stated in the contract. The method of calculating fees, the frequency and method of payment, the currency of payment (including the basis of currency conversion), and the time period covered should be outlined in detail. If different compensation methods are used for individual stages of a project, it is important to keep the above points in mind for each stage. If the consulting firm is incorporated in one country and the client is located in another, a statement should be included concerning the tax liability of the consultant.

In some countries, the upward trend in costs over a period of time may make the original estimates unrealistic. It may thus be necessary, after lengthy negotiations, to make an upward revision of professional fees in order to compensate for cost increases which have occurred since initial estimates were submitted.

COST FACTORS

There are many methods of calculating and quoting fees. All systems have in common the consultant's desire to cover the costs of carrying out a project and to make a profit. The principal cost factors of an assignment include: (a) salary costs; (b) overhead expenses; and (c) direct out-of-pocket expenses related to the project.

SALARY COST

The salary cost of a consultant would include his regular salary plus the cost of supplementary benefits contributed by his employer and, for work abroad, additional overseas allowances.

The supplementary benefit payments made by consulting organizations on behalf of their employees may include premiums for health insurance and life insurance, retirement benefits and other social benefits. According to the country and the individual organization, these may range from 15 to 50 per cent of the base salary.

In the case of foreign consulting assignments, special overseas allowances and family separation allowances may also be paid to the consultant. These additional inducements vary considerably with the length of the assignment and the conditions prevailing in the country of assignment. They may range from 20 to 60 per cent of the base salary.

Salary cost per effective working day

To determine the salary cost of a consultant per each effective working day, it is first of all necessary to calculate the number of actual working days in a year. This is done by subtracting from the total number of days in a year weekends, public holidays, vacation days and an average number of days for sick leave. Depending on the country, there are approximately 220 effective working days per year, which is equivalent to 1,760 man hours (eight hours per day).

The following calculation of the salary cost of a consultant on foreign assignment per effective working day is given for purposes of illustration. The base salary (given in U. S. dollars) and percentages are arbitrary and should not be interpreted as guidelines. It should also be pointed out that this method of calculation is highly simplified.

$$\begin{aligned}
 & \frac{\$ 15,000 \text{ (annual salary)}}{220} \\
 & + \frac{\$ 15,000 \times 30\% \text{ (estimate for supplementary benefits)}}{220} \\
 & + \frac{\$ 15,000 \times 30\% \text{ (estimate of special overseas allowances)}}{220} \\
 & = \frac{\$ 15,000 + \$ 4,500 + \$ 4,500}{220} = \frac{\$ 24,000}{220} = \$ 109.09 \text{ (salary cost per} \\
 & \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \text{effective working day)}
 \end{aligned}$$

The above costs do not take into account profit or overhead costs which are outlined below. The salary cost of a consulting assignment is based on the number of man hours or days worked by each professional and technical employee, multiplied by the respective rate per effective working day or hour for each. The salaries and supplementary benefits of clerical and general staff are generally calculated as part of overhead expenses.

OVERHEAD EXPENSES

There are a number of methods of computing overhead costs and what they cover exactly. Overhead expenses vary according to the size and complexity of an organization and range from 60 to 100 per cent or even more of the cost of professional salaries.

The necessary costs of administering an organization, such as rent, taxes, depreciation of fixtures, utilities, salaries of secretaries, clerical workers and translators, with accompanying supplementary benefits, supplies, postage, telegrams and telephones, library costs and the like fall within the category of overhead expenses.

In addition, it must be remembered that not all the productive time of professionals is devoted to client assignments. General executive and administrative duties, including business promotion, the contacting of potential clients and the preparation of proposals, as well as attendance at professional meetings, training programmes and the like are classified as overhead expenses.

DIRECT OUT-OF-POCKET EXPENSES

The direct costs incurred for a project include such items as travel, subsistence, identifiable communications costs, legal fees, laboratory charges, printing, electronic data processing, field surveys, supplies, reproduction costs and the like. With regard to assignments of longer duration—6 months or more—the direct expenses would include transportation and living costs of resident consultants and, in some cases, their families. The consultant may, if the contract so stipulates, be responsible for all or some of the out-of-pocket expenses. These costs are generally included in the consultant's estimate of fees.

TYPES OF FEES

PER DIEM

The system of *per diem* payments is generally used for short-term assignments involving the personal services of one or several consultants. It is particularly suited to assignments requiring the advice of the consultant, the preparation of reports, and investigations and activities for which little or no design, drafting or related services are required.

This system of remuneration is commonly adopted by management consultants, economists and specialized consultants. Consulting engineers

frequently charge *per diem* rates for preliminary investigations and reports, as well as for the supervision of installation, erection and construction.

When such services are performed, each professional man is compensated for all the time he has devoted to the job, including travel time, which is prorated on a daily basis. In the case of consultants engaged for the execution of projects which require continuous service for a certain period of time, the rates may be established on a weekly, monthly or annual basis. These rates vary with the seniority status, reputation and experience of each person employed. The daily rate may range from \$ U.S. 90 to \$ U.S. 120 for partners in one industrialized country, and \$ U.S. 150 to \$ U.S. 350 for senior staff members in another.

As a rule, the *per diem* fee covers salary and overhead costs as well as profit. The results of a study of the *per diem* fees charged by a number of management consulting firms in one country for various grades of professional employees appears in Annex 3. The *per diem* fee, however, does not always cover overhead costs. In some cases they are calculated separately and billed on a *pro rata* basis. In general, out-of-pocket expenses are reimbursable.

When the scope of the project can be defined accurately, the contract may specify the number of working days it will take to complete the project, how many consultants are to be assigned and what the *per diem* rates will be. This is equivalent to a lump sum quotation. The *per diem* arrangement, however, provides for adjustments in payment if the work programme is altered or extended.

THE BRACKET QUOTATION

If the scope of a project cannot be defined accurately, the consultant often estimates total fees and gives a bracket quotation. This means that he quotes a minimum and a maximum fee, on the understanding that the work—which will be billed on a *per diem* basis—will be accomplished within that range, unless there is a change in the scope of the project or unforeseen circumstances arise.

SALARY COST MULTIPLIED BY A FACTOR, PLUS OUT-OF-POCKET COSTS

The system of salary cost multiplied by a factor and related systems of remuneration, which are based on costs to the consultant, are applied frequently in cases when the scope of the work and the professional services required cannot be clearly defined. These may be preliminary engineering studies, process studies or investigations to establish the final design. The contract, however, should include a general description or statement

of the work contemplated. Many research institutes and management consulting firms have adopted this method of charging clients.

Fees are calculated by multiplying the fixed payroll costs—based on actual time spent on the project—by a given factor. The factor is meant to compensate the consultant for overheads, provide a reasonable margin for contingencies, and cover interest on invested capital, readiness to serve and profit. The multiplier varies with the place in which the consulting organization is located as well as the length and type of assignment, and is usually 2.0 and above. An example of the median ratio of *per diem* rates to base salary in 50 American management consulting firms is given in Annex 3. In that study, the factor varied from 2.3 to 3.0, according to the level of the personnel.

Under this payment system, the client may require that proposals be accompanied by estimates of direct salary costs and out-of-pocket costs, broken down into local and foreign currency costs. The consultant may also provide the client with a statement of the relation of fees to direct salary costs and specify to what extent the factor represents overhead costs.

TOTAL COST PLUS FIXED FEE

This method of payment, a variant on the previous one, is also used when the definition and scope of the work cannot be clearly defined. This applies particularly to consulting engineering projects. The cost-plus-fixed-fee contract specifies that the consultant shall be reimbursed for the direct costs of all his services and supplies, including salary cost, overhead and out-of-pocket expenses. In addition, the consultant and the client negotiate a fixed fee to cover contingencies, interest on invested capital, readiness to serve, and profit. For engineering projects, the fee is often a percentage of the estimated construction costs.

Since the fee is fixed, the contract should provide for adjusting it at any time when the scope of the project, the time necessary for completion, or the services required change substantially. Instead of a fixed fee, a percentage fee—based on salary cost or salary cost plus overhead—may be agreed on. Such a system presents few or no problems in case of changes or additional work. This method of payment is frequently used when the client desires to subject as large a portion of costs as possible to audit.

PERCENTAGE OF ESTIMATED OR ACTUAL COST OF CONSTRUCTION

This system is used for compensating consulting engineers for the preparation of designs, drawings, specifications and other documents which describe the facilities to be constructed. Construction supervision is fre-

quently billed at cost. The basic assumption here is that engineering costs vary in direct proportion to the cost of construction.

Various fee schedules have been worked out, which relate engineering costs and construction costs to certain types of engineering design. These schedules apply when design procedures and construction materials are more or less standardized.⁵ The fee varies with the size and type of the project, the difficulty of the engineering and the extent of the services required. Since these fee schedules relate specifically to construction projects within the country in which the consultant is located, they must be adapted so as to be applicable to work done in another country.

The contract should specify whether the percentage is based on the estimated or the actual construction costs. In the latter case, an alternative payment method should be stipulated in the event the work is abandoned.

If the fee is based on estimated construction costs, it may be established before beginning the final design. The consultant is thus not penalized for reducing costs through improvements in the final design. On the other hand, if his fee is based on "actual" construction costs, there is no incentive to reduce them as much as possible. Moreover, the contract should expressly state what is included and excluded from construction costs. Out-of-pocket costs may or may not be considered as part of construction costs.

FIXED LUMP SUM PAYMENT

Under this system, the consultant determines a fixed amount of remuneration before starting a project. Consultants generally calculate the charges by means of one of the other systems of remuneration. A substantial contingency provision, however, is usually added to cover business risks.

The scope of the project should be defined precisely, and the time within which the work is to be done should be stated in the contract. In addition, provision should be made for changes in payment if the scope of the assignment is fundamentally modified.

Many clients—particularly governments of developing countries—prefer the above method of compensation because they want to know the cost of project before signing a contract. But from the consultant's point of view, unless the scope of the assignment can be defined accurately, this method of payment involves a high element of risk.

In practice, the various methods of remuneration are frequently combined. For example, the contract may fix a minimum or a maximum lump sum fee, and stipulate that charges are to be calculated on the basis of another system.

⁵ Such a schedule is reproduced in Annex 3.

THE RETAINER FEE

Under this system, the client pays the consultant a fee for being available during a certain period of time. Terms for such services vary widely. Annual retainers are usually based on agreed schedules of payment and consultative services. If the time spent exceeds that which is specified in the contract, additional charges at a stipulated rate may be made by the consultant. Travel and other direct expenses are usually reimbursed as out-of-pocket costs.

The retainer system has the advantage of allowing the client to benefit by the specialized knowledge and experience of the consultant readily and on call. It ensures that the latter will so regulate his commitments that he will reserve sufficient time for the particular client, and not accept other engagements which might conflict with that service.

CHECKLIST

In establishing a consultant's fee for a particular project, the following checklist may be helpful :

- (a) Is the fee arrangement suitable to the type of project or to the specific stage of the project ?
- (b) Is the fee arrangement flexible enough with regard to changes in scope and additional work ?
- (c) Does the remuneration relate to the time period or to the work to be undertaken ?
- (d) To what extent is the fee based on direct costs to the consultant, and how are costs calculated ?

The client-consultant relationship

THE SUCCESS OF a consulting engagement depends not only on a practical, realistic and scientific approach to the solution of a problem, but also on a clear understanding of the role of the consultant and the client and on the effective performance of those roles.

To use consultants successfully, the client must make every effort to establish a relationship of mutual confidence and co-operation. It is well to recognize, therefore, that the consultant forms part, in a sense, of the client's own organization. This means that both parties must be able to establish effective communication, an atmosphere of frankness, a common understanding of the objectives of the project and of the way in which it is to be attained.

There are no set rules to ensure a successful client-consultant relationship. However, certain guidelines for an effective relationship can be recommended. First of all, each party has certain responsibilities.

RESPONSIBILITIES OF THE CONSULTANT AND THE CLIENT

RESPONSIBILITIES OF THE CONSULTANT

Consulting is, by nature, a personal service. Consultants must therefore observe high standards of conduct, similar to those followed by reputable individuals and organizations in other professional branches. They must carefully avoid all acts or practices which are undignified or unprofessional or which might discredit or injure their profession.

Consultants should confer with the organization considering the use of their services in order to determine the nature and scope of the assistance required, and to explore the benefits that may be attained. This preliminary discussion is usually undertaken without obligation to the prospective client.

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country or territory or of its authorities, or concerning the delimitation of its frontiers.

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In view of the responsibilities the consultant has towards his prospective client, he must state his case solely on the basis of his experience, reputation and ability, and not promise more than he can perform successfully. Furthermore, the consultant should give the prospective client every reasonable opportunity of inspecting his record, and should assist him in its interpretation.

Unfortunately, not all consultants present their qualifications in a dignified and truthful manner, consistent with high professional standards. Prospective clients should be wary of consultants who offer free services, guarantee results or savings, or propose a fee contingent on the findings or the results of the services performed. Such inducements are not compatible with sound professional practices. Reputable consultants make their professional experience available to clients and serve them to the best of their skill and ability. Those who promise more are unfaithful to the best interests of clients.

Codes of ethics

In many countries in which the consulting profession plays an important role, the practitioners have formed professional societies or associations. A major concern of such bodies is the adoption of codes of ethical practice.⁶ One of the conditions of membership is the acceptance of the obligation to practice the profession in accordance with the rules set down in such codes.

Professional codes of ethics cover some of the more obvious, more definable, more practical, or more readily enforceable rules of conduct; they cannot possibly cover every contingency. However, codes which deal with the ethical dimensions of the profession's role in society do serve a useful, if limited, function.

To be effective, a code of ethics must be precise and deal fully with all the ethical aspects of the profession. But the adoption of a code, no matter how complete and detailed it may be, is not enough. The members of the profession must study the code, know why the rules are there, and understand its general importance as a part of professional life. Finally, if such rules are to be more than a codification of existing practices or a public relations tool, they must provide for sanctions. The lack of proper penalties is the main reason why even well-constructed codes have had little impact in many professions.

Though codes may differ in their wording, their ultimate aim is to set down the rules of decent conduct on the part of the members of the profes-

⁶ The provisions included in codes of ethics may be studied in greater detail in the Specimen Codes of Ethics which appear in Annex 4.

sion. Codes of ethics generally state that a consultant should notify the client of any circumstances which limit what he can do on his behalf. They contain provisions for the ethical treatment of any confidential or proprietary information supplied by the client. They establish fundamental rules to prevent conflicts between the consultant and the client and with other parties with whom the consultant comes into contact.

A consultant's membership in a professional association, therefore, constitutes an assurance to the client that the person he is employing has subscribed to certain minimum ethical standards. Nevertheless, a number of consultants with the highest ethical standards may, for one reason or another, not belong to a professional association.

In the final analysis, a code of ethics is only a help. It reflects the moral standards of the professional man; it does not guarantee the correctness of the decisions he will take. Submission to its rules can ensure that the ethical factors permanently relevant to practical decisions are taken into account, but it cannot ensure that these decisions themselves will always be right and appropriate, or that the consultant will always maintain the standards prescribed. The best indication of a consultant's ethical standards is his conduct in the execution of past assignments.

RESPONSIBILITIES OF THE CLIENT

There is no formal code outlining the ethical practices of clients toward the consultant. If such a code were prepared, however, it would surely contain those rules which are essential to mutual respect and to a sound professional relationship, such as :

- (a) The client's responsibility is to select consultants on the basis of their merit and in accordance with accepted practice.
- (b) The client should pay adequate and equitable fees to the consultant for his services, in accordance with the schedule specified in the contract.
- (c) The client should accept the consultant as a professional adviser and treat him with respect and confidence.
- (d) The client is under an obligation to furnish the consultant with the information and data he requires, and to review and approve the information and recommendations submitted by the consultant.
- (e) The client must accept the consequences if he does not follow the consultant's recommendations.
- (f) The client should respect the consultant's position with regard to third parties such as contractors, materials suppliers, etc., and not bypass the consultant in his dealings with them.

GUIDELINES FOR AN EFFECTIVE CLIENT-CONSULTANT RELATIONSHIP

One of the obstacles to sound working relations between client and consultant is the fact that the client often has an unclear or faulty conception of what he can expect from the consultant.

Vague feelings of discontent or unrest are not adequate reasons for engaging a consultant. There should be specific reasons for considering the use of outside assistance in any given situation. Consultants may waste time and money in defining and planning a project or assignment if the client is not prepared at the outset to tell them what is desired. The client should specify the conditions under which an assignment is to be undertaken, the results to be achieved and any rules or limitations within which the assignment must be executed.

One of the consultant's first responsibilities is to make certain that the client understands what his function is and how he will operate. The more clearly the benefits expected are formulated, the more likely it is that the client will be pleased with the result. It is not by accident that consultants employed to supervise the installation of computers and electronic data processing systems and to check the claims of competing manufacturers and salesmen impartially, have registered a high percentage of satisfied customers. These are assignments that can be precisely defined and their results evaluated.

There will be better understanding and communication between the client and the consultant if each of them appoints a representative or committee responsible for a project from its inception to its completion. Each of the two representatives must make sure that he understands fully the objectives to be attained, the terms of the contract, the rate of progress expected, and the schedule of the future programme. Each must bear in mind the necessity of adequate communication, be on the alert for any failure of co-operation among his associates at the working level, and take any remedial steps that are called for. The liaison agent appointed by the client should be of sufficiently high rank to enable the consultant to have access to the highest administrative or management levels and also to arrange for any assistance required on his own authority.

The difficulties which are usually encountered in establishing a smooth and harmonious working relationship between the client and the consultant are due to the fact that the client is not an individual, but what may be called a "client system" that is, an organization, government department, or industrial enterprise with a number of employees. It is not unusual for the client's employees to resent the presence of one or more highly paid outsiders whose advice may have considerable impact on their job, and to consider it as a threat to themselves. This feeling may be heightened when the outsiders also happen to be foreigners. Unless sensible precautions are taken, the very persons who will have to work most closely with the

consultant, and whose frank co-operation is important to the success of the project, may be the ones most disturbed by his arrival. The engineering staff of a factory or a government department may interpret the designation of the outside consultant as an implicit criticism of their own competence and set out, consciously or unconsciously, to prove that he is no more capable of coping with the problem than they are.

It is important, therefore, to prepare the ground well before the consultant arrives. This ensures co-operation on the part of all those he will meet. As much as possible, all key personnel expected to work with the consultant should be associated with the decision to employ consulting services. Such a course will avoid making those whose co-operation is vital to the success of the project feel that outside help is being imposed on them. All others should be fully informed of the nature and scope of the consultant's activities. It should be made clear to all the employees of the client who supply facts or express opinions that their confidence will be respected.

The client should start on the assumption that the consultant is working in the best interest of the client organization, and he should assure his personnel of that fact. Failure to do so may result in the withholding of information essential to the success of the project and make the consultant overlook important factors which, if not taken into consideration, may cause waste of time and effort. The result would be either an increase in cost or a decrease in efficiency. It may also lead to inadequate answers to problems.

To establish a climate of co-operation, good personal relations must be developed between the client and the consultant. As a first step, the consultant's staff should be introduced to employees of the client organization at the beginning of an assignment. In view of the high cost of the consultant's time, it is to the client's advantage to provide as many supporting services from his own organization as possible. It is equally advantageous to release personnel at all levels from other duties so that they may be able to assist the consultant. Owing to the considerable cost of consulting services, it is a sensible precaution to make sure that all those on whom the consultant will have to rely in the client system are available, willing and co-operative.

Moreover, the client should bear in mind that, though some of the services requested by the consultant during the execution of the project may not be listed in the contract, it is to his advantage to provide them if they are reasonable and will help to expedite the project.

Both the client and the consultant must see to it that proper channels of communications are established and utilized. This requires an agreement as to whom letters, communications and reports must be addressed, as well as an agreement on the frequency of written reports or personal contacts. In a client-consultant relationship, it is important to maintain continuous communication, with a view to testing hypotheses and opinions, reviewing

techniques, manpower and the like, in order that the consultant's final recommendations may be based on the best combination of technical expertise and practicability.

The need for co-operation between client and consultant is no less important when differences of opinion arise. If harmonious relationships have not developed between all concerned, minor infractions of what one party or the other had understood to be an obligation may be magnified far beyond their importance to the project. Hence, such disagreements should be brought to light at an early stage and the responsible people on both sides should endeavour to work out agreements as to what should be done.

The consultant is bound by the terms of the agreement as to the timing and nature of the services he must perform. He may be penalized financially for delays in completing the assignment. He may be assessed damages for deficiencies in performance. Usually, the client has no other formal obligation than to pay for the services according to the schedule specified in the contract. It is sometimes possible to set down in detail the kind and amount of information and services he is supposed to contribute. But these are ordinarily not expressed in such a way that a penalty can be assessed against him. If the client's attitude obstructs the completion of the assignment, the consultant has no other recourse than to discontinue the arrangement. He should, however, organize the results of the work already done in a way that it may be useful to the client.

If the client and the consultant are unable to settle points in dispute, which occurs very seldom, they should turn to third parties as arbitrators. Sometimes, the manner in which arbitration is to be brought about is stipulated in the contract. The International Chamber of Commerce (ICC) rules of impartial arbitration are incorporated in many international business contracts. The ICC Court of Arbitration in Paris applies an international system of arbitration which can be a great help to those who use consulting services in the event of contractual misunderstandings. When the method of arbitration is not stipulated in the contract, the procedure generally used for selecting arbitrators is to conclude an agreement whereby each party selects an arbitrator, and the two arbitrators thus chosen select a third one.

EVALUATION OF CONSULTING ENGAGEMENTS

When a consulting engagement is completed, the client should reassess his choice of a consultant and how that choice was justified, as well as the performance of his own personnel. It is often difficult to discover the factors which make one assignment more successful than another. Sometimes, it is even difficult to decide whether or not the consulting relation-

ship itself was successful, to say nothing of the problems of measuring the relative performances and determining the elements responsible for success or failure. The factors that contribute to the success of a consulting assignment are mainly human. The consultant may well provide special skills, talents and knowledge, but both he and the client must also contribute time, effort, judgement, common sense, insight, and willingness to cooperate in the search for better solutions. The results of an assignment, on the other hand, are often intangibles, i.e., plans, ideas, recommendations and suggestions. These are not particularly susceptible of measurement and analysis. Furthermore, the impact of the consultant's assistance is usually of a long-range nature.⁷

This being so, there are a number of factors which the client can review in order to evaluate a specific assignment. These factors also provide a guide for future relations with consultants. The checklist below was designed to evaluate survey assignments in the field of consulting management. It focuses on the client's problems and makes recommendations for solving them.

CRITERIA FOR SURVEY ENGAGEMENTS⁸

Were the purpose, scope, general plan of procedure, type of results anticipated and terms of the engagement clearly defined, preferably in writing, and reviewed with the client by the consultant?

Was the work to be performed for the client carefully planned by the consultant? (Ordinarily, the "plan of study" for a client engagement should include such points as the scope of the project, the anticipated results of the study, the methods to be employed and the approaches to be used in the conduct of the study, supervision and staffing of the engagement, survey time schedule, and type of report to be submitted.)

Did the consultant make progress reports to appropriate executives in the client organization during the course of the work? Did the professional staff of the consulting organization conduct themselves in a professional manner? Did they show workmanlike performance in the fact-finding and other analytical aspects of the work? Did they demonstrate professional competence, objectivity, and integrity?

Did the consultant work constructively with client personnel? Did he make constructive use of client personnel during the engagement?

⁷ Based on a paper prepared by UNIDO with the assistance of Stanley C. Hollander, entitled "The use of industrial consultants in developing countries", presented at the International Symposium on Industrial Development, Athens, December 1967.

⁸ These criteria are taken from Philip Shay's *How to Get the Best Results from Management Consultants*, Association of Consulting Management Engineers, New York, 1965, pp. 42-44.

If not, was there adequate justification for using his own staff? Was the engagement adequately supervised? Was it carried out with a minimum of disruption in the client organization?

Did the consultant acquaint client personnel with any principles, methods, skills, or techniques he used or applied, so that the improvements suggested or installed could be properly managed and continued after completion of the engagement? Did he stimulate their thinking and expose them to new ideas?

Did the study achieve the objectives of the engagement as set forth in the initial proposal and in the engagement plan, or as modified during the course of the work? Were the solutions developed complete, timely, practical, and suited to the client's specific needs? Was the suggested course of action the most effective and economical from the client's point of view? Did the recommendations take into account the human element and the ability of client personnel to carry them out? Were the objectives, policies, long-range plans, and other crucial factors of the client organization given proper consideration in the recommendations?

Was the client satisfied that the best collective judgement of the consultant and his own executives was incorporated in the recommendations?

Were the findings, conclusions, and recommendations explained adequately to client personnel responsible for reviewing, accepting, or implementing them? Was the client satisfied with the way these findings and recommendations were reported to his organization?

Did the consultant emphasize the importance of carefully planning the implementation or installation of the approved recommendations? Did he maintain close contact with, or help, the client organization during the consideration and installation of the recommendations?

Was the work accomplished within reasonable time and fee limits? Were the original time and cost estimates realistic? If not, were revisions reasonable and cleared with the client in advance?

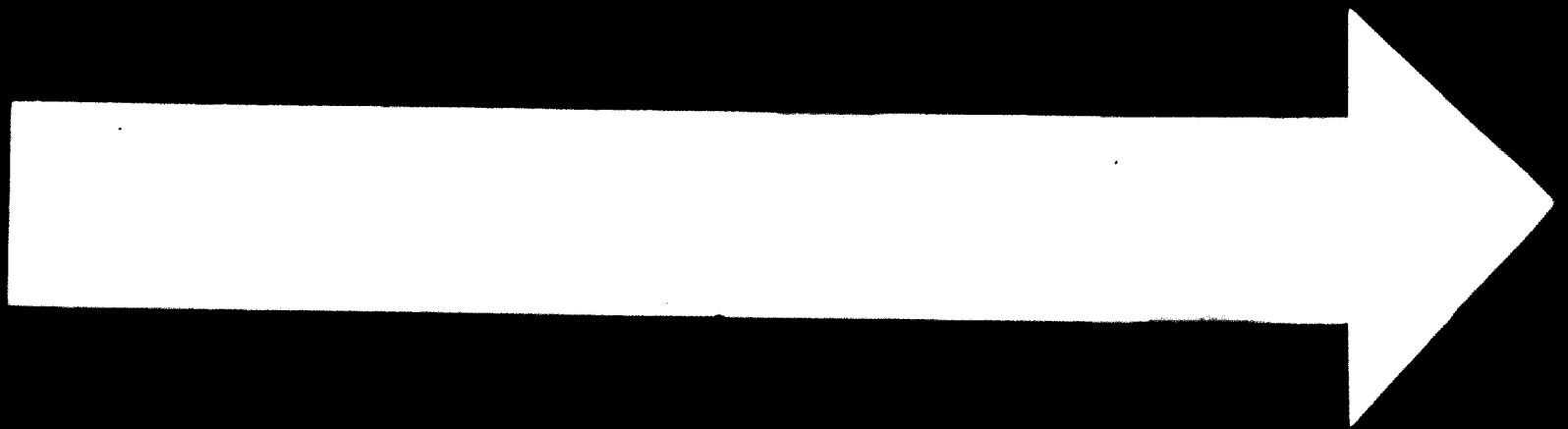
How many recommendations were accepted? How many were rejected? How many modified? Why were some turned down and others adopted? What was the operating impact of the engagement on the client organization? What is the over-all evaluation by client executives of the value of the consulting engagement?

Did the consultant make a post-installation review of the recommended improvements or results of the engagement?

Was the client satisfied with the performance of his own organization in working with the consultant?

Have the client executives become more competent managers as a result of working with the consultant?

Would the client retain the consultant again if he had need for his kind of professional services?



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Foreword

A UNITED NATIONS Inter-Regional Seminar on Industrial Research and Development Institutes in Developing Countries was held in Beirut, Lebanon, in December 1964 to seek ways and means of strengthening existing and future industrial research and development institutes in developing countries.

In the course of the discussions, questions were frequently raised as to how to select, establish contacts and conduct relations with outside consultants, particularly those from foreign countries. Many of the participants stated that they lacked direct experience in such matters and usually had to spend considerable time and effort in obtaining consultative help either for their own projects or in connexion with inquiries from local agencies or enterprises.

In view of the importance of the role of consultants in the development process, the participants of the Beirut Seminar agreed that it would be worth while to prepare a Manual on the use of consultants that might serve as a guide to developing countries.

As a result of these discussions, the Centre for Industrial Development — the predecessor organization of the United Nations Industrial Development Organization — decided to publish a Manual on how consultants can best be used to provide practical guidance to industrial managers and administrators, government officials and others faced with industrial development problems in developing countries. The purpose of this Manual was approved by the Committee for Industrial Development, a subsidiary body of the Economic and Social Council, at its Fifth Session in May 1965.

The primary aim of the Manual which is now presented is not only to provide government officials, private businessmen and others who often use consulting services with background information on the selection and effective use of such services, but also to show the organization of the consulting profession, the types and scales of fees that are usually paid, and the contract forms etc. commonly used, in order to provide guidelines for the establishment of local consulting organizations in developing countries.

For the purposes of this report, a consultant is defined as a person or an organization employed by a client organization, on account of his or its

specialized knowledge and experience, to act as an industrial adviser or to assume responsibility for action programmes for industry. Though many sections of the report apply to all types of consulting activities, the study of specific types of consulting services is limited to those of industrial consultants who act as advisers on engineering, technological, economic, managerial and training problems, and does not deal with the activities of consultants in other sectors or in the development of infrastructure, such as transportation, power, education and so forth.

Consultants are professional problem-solvers, whose expert knowledge may cover a number of traditional professional fields, and who are particularly qualified to undertake an independent and unbiased study of a given problem and reach a rational solution. The value of a consultant lies in his training and previous experience in the solution of related problems, and in his ability to select the course of action which, in his expert opinion, should be implemented.

This Manual was prepared with the co-operation of a number of experts in the consulting field and generally reflects the views of those who habitually supply and receive consulting services in both developed and developing countries. A background report which served as a basis for the present Manual was prepared by the Centre for Industrial Development with the assistance of Lawrence W. Bass. This report was sent to over two hundred and fifty honorary correspondents specialized in industrial consultancy in a number of countries, with a request for their comments and suggestions. Particularly useful comments were received from: R. Agrawal, Chairman, Agrawal Limaye Management Engineering Consultants, Bombay, India; J. C. Armstrong, President, George S. Armstrong Company, New York, USA; S. P. Banerjee, Consulting Chartered Structural Engineer, Calcutta, India; C. Bernard, Secretary, British Overseas Engineering Services Bureau, London, United Kingdom; J. Bognar, Centre for Afro-Asian Research of the Hungarian Academy of Sciences, Budapest, Hungary; H. E. Bovay, President, Bovay Engineering, Houston, Texas, USA; S. Braden, Jr., Consultant, Bogotá, Colombia; O. S. Bray, President, Jackson & Moreland International, Boston, Mass., USA; E. K. Bryant, Member, American Institute of Consulting Engineers, New York, USA; D. A. Buzzell, Executive Director, Consulting Engineers Council, Washington, D. C., USA; B. C. Carlberg, Ekonomisk Foretagsledning (EF) AB, Stockholm-Solna, Sweden; C. H. Chen, Manager, Productivity Division, China Productivity and Trade Centre, Taipei, Taiwan; B. P. Coe, Executive Director, Volunteers for International Technical Assistance Incorporated, Schenectady, N. Y., USA; C. W. van Dorsser, Honorary Secretary, Orde van Nederlandse Raadgevende Ingenieurs, The Hague, Netherlands; V. Farkas, Ekonomski Fakultet Zagreb, Zagreb, Yugoslavia; L. L. Fishman, Director, Economic Associates Incorporated, Washington, D. C., USA; C. J. Foxall, Secretary, Association of Consulting Engineers, Sydney, Australia; C. Frey, Office of the Secretary, Engineers Joint Council, New

York, USA; A. V. Torres Garcia, D. I. M. S. Consultants, Buenos Aires, Argentina; A. J. Gideonse, Raadgevend Bureau Ir. B. W. Berenschot N. V. Consulting Management Engineers, Hengelo, Netherlands; M. B. Gran, Secretary, Radgivende Ingeniørers Forening, Oslo, Norway; J. Guiot, Chambre syndicale des Bureaux d'études techniques de France, Paris, France; A. Gustafson, Chairman, Swedish Association of Management Consultants, Stockholm, Sweden; D. A. Harper, Contracts Manager, Sandwell and Co., Vancouver, Canada; J. Hartmark, Norsk Forening Av Radgivende Rasjonaliseringsfirmaer, Oslo, Norway; R. G. Havemeyer, Case & Company, New York, USA; D. B. Hertz, Director, McKinsey & Company, New York, USA; W. T. Hocking, Executive Vice President, Fry Consultants, Chicago, Ill., USA; A. Hubesch, Secrétaire Général, Etudes et recherches industrielles, Brussels, Belgium; F. Hussein, Director General, General Organization for Industrialization executing the Five Year Industrial Plan, The Industrial Design Administration, Cairo, United Arab Republic; C. R. Jones, Chairman, Overseas Engineering Committee, National Society of Professional Engineers, Washington, D. C., USA; Klockner Industrie-Anlagen GmbH, Duisburg, Germany; W. A. W. Krebs, Vice President, Arthur D. Little, Cambridge, Mass., USA; M. J. Laborde-Milaa, Société générale d'exploitations industrielles, Paris, France; W. G. Lilly, Gordon Lilly Company, Location Consultants, London, England; R. Mattsson, President, Rationellt Näringsliv AB, Stockholm, Sweden; T. M. Medland, Executive Secretary, The Association of Consulting Engineers of Canada, Toronto, Canada; O. Phillips Michelson, Independent Consultant, Bogotá, Colombia; Middle East Industrial Relations Counselors, Beirut, Lebanon; U. P. Mullick, President, Institute of Consulting Engineers, Calcutta, India; H. J. Nevitt, Independent Consultant, Toronto, Canada; F. G. Nicholls, Project Manager, Applied Scientific Research Corporation of Thailand, Bangkok, Thailand; P. A. L. Northcott, W. S. Atkins and Partners, Epsom, Surrey, England; K. Pennathur, National Productivity Council, New Delhi, India; E. J. Quirin, Chairman of the Board, Frederic R. Harris Incorporated, New York, USA; L. O. Rice, Urwick, Orr & Partners International Limited, London, England; H. Robinson, Associate Director, Economic Development Research, Stanford Research Institute, Menlo Park, Cal., USA; O. H. Rose, Research Manager, International Research & Development Co. Ltd., Newcastle Upon Tyne, England; A. Rusck, Project Manager, Industrial Studies & Development Centre, Dar-es-Salaam, Tanzania; Y. Sakata, Managing Director, Marketing Management Center, Tokyo, Japan; Ph. W. Shay, Executive Director, Association of Consulting Management Engineers, Inc., New York, USA; D. Sotiriou, Doxiadis Associates, Athens, Greece; W. H. Stevens, Honorary Secretary, Association of Consulting Scientists, Bromley, Kent, England; W. Tvede, Den Danske Sammenslutning, Af Konsulenter I Virk-Somheds-ledelse, Copenhagen, Denmark; J. Morales Valarino, Director General, Instituto Venezolano de Productividad, Caracas, Venezuela; F. J. Van Antwerpen, Secretary, American Institute of Chemical Engineers, New York, USA;

C. P. Fernando Vilchis, Tomas Vilchis y Cia, S. C., Mexico City, Mexico; S. Bastos Villaca, Director, Centro Nacional de Productividade na Industria, Rio de Janeiro, Brazil; F. Vlasak, Minister-President, State Commission for Technology, Prague, Czechoslovak Socialist Republic; W. H. Wisely, Executive Secretary, American Society of Civil Engineers, New York, USA.

A series of meetings was held at the United Nations Headquarters in New York between 10 and 21 October 1966. The purpose of these meetings was to study the initial report and the comments received from the honorary correspondents listed above, to hear the views of the experts present, and to put into final shape a revised draft proposed by the Centre for Industrial Development. The expert group was composed of: Lawrence W. Bass, Consultant, New York, USA; William B. Campbell, Consultant, Jamaica; Ikram Youssef Sayed, Director, Management Consulting Centre, National Institute of Management Development, Cairo, United Arab Republic; Celestino Segni, Director, Italconsult, Rome, Italy; Jean Vasseur, Adjoint au Chef du Service des affaires extérieures, Ministère de l'Industrie, Paris, France; Vratislav Vik, Head of Department, State Commission for Economic, Scientific and Technical Co-operation, Prague, Czechoslovak Socialist Republic; and Hitoaki Yamaguchi, Managing Director, Engineering Consulting Firms Association, Tokyo, Japan, as well as by staff members of the Centre for Industrial Development including Azmi A. Afifi, Chief, Industrial Institutions Section, Louay Katkhouda, and Marta Ward, all of the same section.

The present Manual, which is based on the suggestions received from the honorary correspondents, is designed to give simple and practical answers to questions relating to the use of the consultants. Many case studies of consulting projects, and actual examples of contracts, fee scales, and the like have been included to illustrate consulting activities.

The first seven chapters of the Manual cover the major questions pertaining to the use of consultants.

Chapter 1 deals with the rôle of consultants in the development process in both developing and industrialized countries, and outlines the main reasons for using outside consulting services.

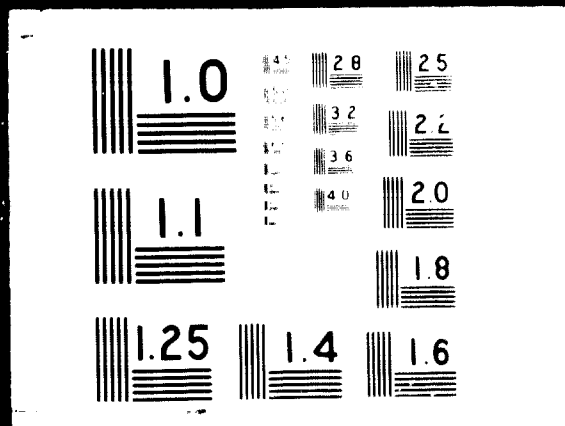
Chapter 2 contains a review of the most important sources of consulting services, including the activities of individual consultants, consulting firms, industrial research institutes, universities, government agencies, foreign governments and international organizations, as well as a review of secondary sources, such as suppliers of equipment, materials or proprietary information, and integrated engineering construction organizations.

The various steps to be taken in the selection of consultants with suitable qualifications and experience to carry out a project successfully and economically are described in Chapter 3. The procedures outlined are illustrated by case examples, and the rules governing the selection of foreign

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ADDITIONAL CRITERIA FOR ACTION ENGAGEMENTS

The following checklist may be used in conjunction with the above list for the purpose of evaluating action-type consulting engagements, such as plans to strengthen research, to penetrate existing markets more completely, to open new markets, to develop new products and services, to establish new facilities, to expand plant capacity, etc.

Was the development programme co-ordinated with the basic purposes and objectives of the client and the resources and true potential of the client organization?⁹

Did the client thoroughly explore the advantages and disadvantages with the consultant before committing the organization to the recommended course of action?

Did the programme reflect client strengths and weaknesses realistically?

Did the consultant help establish the organizational and procedural framework necessary for the programme?

Did it provide for timely action on major moves and give lead time for distant ones?

Did the programme apply the client organization's resources and talents to the most profitable uses?

Is there improvement in the teamwork of client executives? Are goals more clearly defined? Are communications clearer? Are operations more effective? Is there actual or potential profit improvement? Do executives agree that the new ways are better than the old ways of doing things?

Was the consultant competent in programming actions and adjusting programmes to changing circumstances? Was he competent in the technical areas in which he worked?

In the final analysis, the best test of a consulting engagement is the client's willingness to employ the same consultant again. That constitutes the strongest evidence that performance has been effective.

⁹ *Ibid.*

(b) Engineering design and preparation of books of tender for equipment. Such books of tender usually include a section on general conditions, technical specifications, schedules and engineering drawings. In some instances, the books of tender for civil engineering works are prepared concurrently.

(c) Evaluation of bids for equipment and recommendations. This step entails the evaluation of the technical characteristics of the bids for equipment, including such factors as suitability, completeness, performance, delivery period, price and financial conditions.

(d) Preparation of books of tender for civil engineering works. After the evaluation of the bids received from equipment suppliers and the selection of the equipment, the engineering drawings, such as plans for buildings, storage houses, bins, silos, water reservoirs, roads and other civil engineering works, are prepared. In some instances, books of tender can be prepared concurrently with those for equipment.

(e) Evaluation of the bids of civil engineering contractors. After the books of tender have been issued to the contractors, the bids are received and evaluated. A report containing the recommendations of the consultant is presented to the client, on the basis of which the contract is awarded.

(f) Supervision of equipment manufacture. Such supervision is generally necessary in the case of industries which require large pieces of equipment and highly specialized parts, and its purpose is to ensure that raw materials and workmanship comply with the specifications. It may include the supervision of performance tests for single machines, functional groups of machines or several pieces of equipment, both during manufacture and before crating.

(g) Co-ordination. This means the co-ordination of the civil engineering and construction works, equipment manufacture, shipping and erection schedules.

(h) Supervision of civil engineering construction. This includes the supervision of the construction of buildings and installation of the water supply, steam generation, piping, and power generation systems as well as power lines, cables and internal wiring.

(i) Supervision of equipment erection and connexion.

(j) Supervision of start-up and commissioning.

(k) Hiring and training of staff. Consultants frequently provide assistance in finding and hiring key staff and arrange for the training of foremen and/or engineers.

(l) Assistance after the establishment and initial operation of the facilities.

Succession of phases

In establishing an industrial project as outlined above, different consultants may be responsible for individual phases of the integrated services. Each of these phases should be undertaken only after the previous phase has been studied properly, its results made known, and the advisable course of action clearly understood by both the client and the consultant. Some of the above-mentioned steps form a well-defined phase or small independent project, at the end of which work could either be stopped or the next phase or series of steps be undertaken. Steps (a), (b), (c), and (e) are such that the client may terminate the project on the completion of any of them. However, once equipment orders are placed (step (f)), the project would normally proceed to its conclusion.

Steps (f), (g), (h) and (i) cover the manufacture of equipment, the actual construction of buildings and the erection of equipment, and generally together constitute one phase. The time required for the completion of these steps depends on the diligence of the contractors and is fixed by contract with the civil engineering contractor and equipment supplier.

Phase (j) (Supervision of start-up and commissioning) ensures that the required guarantees are met. Part payments may be delayed until this phase yields successful results. Phase (k) (Hiring and training of staff) generally takes place while the plant is in the erection stage. It is performed at little or no cost except when travel or other expenses, such as for advertisements, interviews, and living expenses, are incurred. These have to be authorized by the client in writing. Phase (l) would form the subject of an entirely new contract.

DISCUSSION OF INDIVIDUAL STEPS

FEASIBILITY STUDIES

A feasibility study should always be made as a first step towards the realization of an industrial project. A number of detailed investigations should be carried out to assess the economic viability of the project and, in the case of a government project, its impact on the economy of the country. The latter study would include an investigation of the contribution of the proposed project to the gross national product, its effect on the balance of payments and the national budget, as well as the possibilities it offers for the creation of employment opportunities. The evaluation of the above factors will provide the government with the elements that are necessary to determine the priority to be assigned to a project within the national economic policy.

In the analysis of feasibility, the first step is generally the evaluation of both the domestic and foreign markets for a product. Together with the study of production trends, foreign trade and consumption, it is necessary to study the price structure at the three most important levels at which transactions take place, namely, ex-factory, wholesale and retail. To that end, the supply sources for competitive goods or services, distribution mechanisms, and the relevant national economic policies such as price fixing, subsidies, taxes, customs duties, as well as relevant international agreements must be investigated, together with certain market characteristics such as size, packaging, and presentation. The results of such an evaluation will enable an estimate to be made of the share of the market which the projected venture could normally expect.

The availability, suitability, fluctuation of supply, and cost of raw materials must also be studied at this stage. Sometimes the evaluation of the amount and suitability of raw materials may constitute a project in itself. For example, the investigation of a mineral deposit may necessitate extensive drilling, probing, analysing and other field and laboratory work culminating in a comprehensive geological and mining report.

In some instances, the skill of the available labour supply and the particular socio-economic conditions of the country or local community, including attitudes towards work in industry or towards the particular industry under investigation, should be taken into consideration.

The location of the plant is an important factor to be determined. The availability and price of utilities (water, power, fuel), transportation facilities and costs, waste disposal, labour supply, and proximity of complementary or subsidiary industries must all be investigated before reaching a decision concerning the final selection of the site.

With all the above information on hand, a decision can then be taken on the capacity of production facilities and the most suitable production process. Next comes the determination of the production and auxiliary equipment needed, as well as their broad specifications, the building and civil engineering to be undertaken and the requirements in land. This study enables the client to estimate the required investment in terms of fixed and working capital, as well as of start-up costs. Production costs can then be estimated. These include the depreciation and insurance of buildings and erected equipment, the amortization of start-up costs, administrative, maintenance, and overhead expenses, interest, and the cost of raw materials, labour, utilities, packaging, selling and distribution.

A comparison of the estimated yearly sales and production and selling costs would yield an estimate of expected profits. Generally, these are shown as a percentage of investment and sales. It is also customary to indicate a break-even point which will give a picture of losses or profits at various production and sales levels.

Even though a project may show profits and sizable net return on invested capital, cash flow projections should also be made, for the problem

of financing differs from that of evaluation. These disparities are mainly due to the fact that reserves, interest, amortization of credits, income tax and dividend payments are viewed from different standpoints. For example, assuming that both reserves and interest charges are included in costs and consequently in sales, they will remain on hand as liquid assets. Moreover, income tax is not included as a cost item in the income and expenditure budget since, for purposes of project comparison, it is more important to estimate profits before taxes.

Financial limitations may be of vital importance when considering such aspects of the project as size or extent of mechanization. In such cases, the problem of financing must be considered simultaneously with the evaluation of the project, and not afterwards. From the point of view of the entrepreneur, financial project evaluation must also provide data on net return on invested capital and hence define the credit volume and interest rates required.

Once the consultant has investigated all relevant technological, socio-economic and financial factors relating to project feasibility, a feasibility report is prepared and presented to the client for his study and for review of the findings with the consultant.

PREPARATION OF OVER-ALL DESIGN AND BOOKS OF TENDER FOR EQUIPMENT

On the basis of the feasibility report and his discussions with the consultant, the client can now evaluate the project. If the proposed project compares favourably with other ventures, the client asks the consultant to proceed with the second phase of the project or selects another consultant for that purpose. From this point onwards, the consultant's activities are classified as "project engineering".

To begin with, the consultant reviews the available technology and selects the one best suited to the project. He then reviews each physical section of the plant and their interrelationship, paying particular attention to such things as the flow of materials, transportation facilities, public utilities, etc. If the plant needs special equipment, the required items are designed with the utmost care.

The books of tender are then prepared. These serve as a basis for the bids of the various equipment suppliers or contractors. The section on general conditions specifies the administrative, legal and financial regulations which govern the relationship between the supplier/contractor and the client.

The technical specifications are generally divided according to manufacturing functions into separate sections by machinery groups. The number of items needed, construction material, design, size, output, capacity, safety features, performance and other relevant requirements are

stipulated. Tolerances and construction standards are also stated where necessary, and measurement instruments and indicators to be supplied on the equipment likewise indicated. No brand names or trade marks are mentioned. But if it is found necessary to mention a brand name in the specification, it should be shown that the brand name or its equivalent is intended.

In addition, workmanship is defined according to specific codes of practice or known references and is ultimately subject to the consultant's inspection and approval. It often happens that manufacturers wish to present alternative specifications. The consultant should therefore not specify details in cases where manufacturers may use different alternatives, nor should he specify dimensions if they do not bear on the process, for they tend to favour one manufacturer over another. The grouping of equipment into functional sections also permits selection of the various groupings from one or more suppliers, provided such a decision does not ultimately interfere with smooth plant operation.

Schedules are special forms devised by the consultant and filled in by the manufacturer. Particulars of each piece of equipment and any additional relevant information are indicated by the supplier in the proper space. Such schedules enable the consultant to compare easily the important characteristics of similar equipment from different suppliers.

Detailed plans, drawings and blue prints are commonly appended to each set of technical specifications. These generally include many details necessary for a clear understanding of the written specifications. Construction particulars and technical drawings are also supplied for custom-built equipment.

EVALUATION OF BIDS AND RECOMMENDATIONS

The call for tender generally specifies the address to which bids are to be sent and the deadline for their receipt. The address is usually that of the client. Bids are sealed and sent by registered mail or by hand, in which case a receipt is issued. A log of offers is kept with the record of the name of the supplier and the date of receipt.

On the date specified, bids are opened publicly and all enclosed documents are numbered and initialled in the presence of the client or his designated representative (who may be the consultant) and representatives of the suppliers.

The consultant evaluates the bids and selects the ones he considers to be most suitable, taking into account their compliance with specifications, their completeness, the quality of supplies, the price, etc. The sections pertaining to functional groupings of equipment are analysed and compared; preferences and their justification are recorded, and alternatives are given.

The remarks on the functional sections are then consolidated and the recommendations concerning each bid are prepared and submitted to the client. It is also customary to prepare a summary table embodying the salient features of each offer. Equipment offers based on inadequate processes, of obsolete design or in a higher price range than other offers are usually rejected after a preliminary evaluation.

The recommendations are then discussed with the client, and the supplier whose bid has been recommended is contacted for negotiation. For large projects, negotiations are conducted concurrently with the first suppliers who have been recommended. During those negotiations, the consultant assists the client in the drafting of the contract and the stipulation of guarantees, as well as in the discussions concerning the delivery period, and sometimes in establishing the schedule of delayed payments and other strictly technical matters.

PREPARATION OF BOOKS OF TENDER FOR CIVIL ENGINEERING

After agreement has been reached on the process design and detailed layout, the plans for the civil engineering works and books of tender for their construction are prepared. As in the case of books of tender for equipment, they consist of general conditions, technical specifications, a bill of quantities, blue prints and drawings.

The technical specifications include a description of the work required, the basic design data, and a description of the dimensions, materials, type of construction and finish of each section of the plant. Specifications for basic ingredients such as cement, sand, reinforcing bars, building bricks, concrete blocks and the like are clearly indicated. Storage facilities, reservoirs, water towers, cooling basins, waste-treatment installation, sheds, administration buildings, roads, fencing, gates, etc. are mentioned with a description of the functions, dimensions and characteristics of each. Water, power and steam lines as well as other utility lines are indicated explicitly, and the size of the outlets and their location are shown on the drawings. The blue prints and drawings are generally detailed enough to allow the contractor to plan the project and estimate its size, and thus make it possible for him to allocate adequate initial funds, labour and auxiliary machinery for construction and to fix the time for completion.

If references are made in the specifications to codes of practice, standards or materials, they should be based on those recognized in the country of construction. When foreign standards are used, they should be explained to the contractor. In this regard, the consultant should assume an educational function, as the local contractor or his engineer may frequently seek his advice and opinion.

Usually, the contractor presents a statement of qualifications which indicates the number and qualifications of his engineers and labour force,

the extent of his facilities and machinery, and a description of similar or large construction projects undertaken by his organization. Only those contractors judged sufficiently qualified may be allowed to bid.

The books of tender are generally sold. The price may range from \$ U. S. 50 to \$ U. S. 500 or more, according to the size of the project. If the job is too large to be handled by local contractors or the required experience is not available locally, the tender is put up for international bidding.

Often, and particularly when erection and installation of equipment is closely connected with and proceeds along with construction, equipment details, layouts and plans are given to the building contractor, who is required to submit a bid for the erection and installation of equipment as well. The co-ordination between construction and equipment installation is thus facilitated and the whole operation progresses more smoothly. However, this does not preclude requesting the equipment supplier to quote separately for the cost of erection and the cost of supplying the equipment. One or more engineers of the individual suppliers are always present during erection to give special installation instructions.

EVALUATION OF CIVIL ENGINEERING CONTRACTORS' BIDS

As in the case of the bids for equipment, the bids for construction are received, opened and analysed. The evaluation of the bids and the recommendations concerning them are incorporated in a short report to the client. The contractor who has been selected on the basis of these recommendations is then contacted, the details of the contract are negotiated and the contract is signed.

The contractor may in turn use subcontractors for those portions of the job outside his general field of activity or when special skills are required. For some processing industries, such as sugar, cement, petrochemicals and the like, the equipment supplier is frequently the construction contractor as well, and undertakes both construction and erection.

SUPERVISION OF EQUIPMENT MANUFACTURE

After the contract for equipment supply has been placed, a periodic check on the materials used, the workmanship and the performance of some machines or groups of machines may be called for. Performance tests are undertaken by the manufacturer and witnessed by the consultant.

Such a service entails travel to the manufacturer's country at various intervals. It is customary, especially if the consultant has no office in the country of manufacture, to subcontract such inspection and certification to inspection agencies which exist throughout the world. These organizations

are also required to check the contents of crates before shipment and to make sure that those contents comply with the lists of contents or bills of lading. This phase may extend throughout the period of equipment manufacture and could proceed while the supplier's or manufacturer's designs are still being submitted to the consultant for approval.

CO-ORDINATION BETWEEN CONSTRUCTION, EQUIPMENT DELIVERY, ERECTION AND SUPERVISION

A master chart is prepared by the consultant, which indicates the schedule of construction, equipment delivery, equipment erection and trial runs, as stipulated in the contracts with various suppliers and contractors. The progress of each activity is recorded on the chart and the work so organized as to ensure that none of these activities proceeds too far ahead or behind schedule, thereby hindering progress or making the execution of some of the work impossible.

The consultant provides a resident staff consisting of engineers as well as quantity surveyors, draftsmen and supervisors to ensure that the plans and specifications are followed and that a high level of workmanship is achieved, and also to interpret the plans to the contractor. As the work advances, it is often necessary to introduce minor alterations in the original designs or installation plans. Such alterations cannot be effected without the written authorization of the resident engineer. Occasionally, new plans are required.

The civil engineering works are measured as they progress, and the authorization for payment is issued to the contractor. It is the site engineer's duty to investigate and request tests in order to ensure that materials and workmanship comply with the specifications or the amendments issued to the contractor. The contract stipulates that the contractor is penalized for not finishing the work on schedule, unless, of course, it is delayed by circumstances beyond control, such as storms, transportation problems, strikes, etc. In such cases, the contractor should inform the consultant in writing at the time the delay occurs.

This phase of the project is the longest one and requires vast practical experience. The resident staff of the consultant is faced daily with administrative and engineering problems which they must solve quickly and effectively. They are backed, of course, by the experience and knowledge of the main office of the consulting organization.

During this period, the senior staff member who is responsible for the co-ordination of the project in the main office visits the site to check the progress of work, to iron out difficulties that are beyond the authority of the site engineers, or to take decisions on matters of principle. Furthermore, it is good practice for the client to hire his key engineers (mechanical, maintenance, etc.) as well as the plant foreman at this particular time. They

can thus gain invaluable experience during the erection and installation of equipment, the start-up, and commissioning.

The consultant should, at all times, act with the necessary flexibility, but should never lose sight of the fact that his main responsibility is to safeguard the interests of his client.

SUPERVISION OF START-UP AND COMMISSIONING

After the installation of production and auxiliary equipment, and the construction of the main buildings as well as the connexion of the equipment to sources of power, steam, water, compressed air and the like, a representative of the equipment supplier starts the machines individually, then in sections, to ensure that they are in working condition. Some equipment may need a running-in period of 24 or 48 hours after which lubrication and mechanical adjustments are effected. These preparatory tests are undertaken by the supplier's representative without the consultant being present.

Meanwhile, the client should take two preparatory steps --the hiring of personnel and labour, and the purchase of raw materials and packaging materials. Once the equipment has been adjusted, the actual "in process" tests proceed, first by section, then for the factory as a whole, under the supervision of the equipment manufacturer and the control of the site engineers. The condition and the performance of the machinery, as well as such items as output, quality of the end product and the consumption of utilities are checked. Generally it is agreed beforehand that guaranteed performance levels are to be met and maintained for a specific period of time. When all tests are completed to the satisfaction of the consultant, an official document is prepared. This document mentions all the details of the commissioning operation, is dated and signed for the record, and used as a basis for payment. It is customary to withhold a percentage of the equipment costs, such as 10 per cent, until satisfactory performance has been met for a certain period of time (six months to one year), during which period the supplier is to replace any defective equipment. Should the plant not reach the guaranteed performance level, the penalty clauses of the contract then apply.

HIRING AND TRAINING OF STAFF

The consultant may arrange to have the client's staff members trained through his industrial contacts, or by the equipment manufacturer or contractor on the job. Certain foremen and key production workers may be sent to the equipment manufacturer's plant for specialized training. The consultant may also locate, interview and select these staff members.

Additional travel and other expenses incurred while carrying out this activity are generally authorized by the client in advance.

While the locally hired staff undergoes training, the responsibility for operating the plant for two or more years is entrusted as a rule to experienced production men, that is, until the client's personnel have acquired sufficient skill to take over the operation.

ASSISTANCE AFTER THE ESTABLISHMENT AND INITIAL OPERATION OF FACILITIES

Once the client's plant is operational and his product is on the market, he may discover that his operation, or a phase or section of it, could be improved. In addition, problems may arise in marketing, production, management, training or other areas. The client may call in the former consultant or a new consultant to assist him in solving such problems. If the client was satisfied with the consultant on the previous assignment, he will generally retain him for the new assignment, since he is well acquainted with the production facilities. On the other hand, the problem may require a fresh approach or fall outside the former consultant's range of activities. In that event, a new consultant is preferred. In either case, services of this nature form the subject of a new contract which has no relation to the previous one.

As examples of integrated consulting services, detailed case studies Nos. 3 and 4 are presented in Annex 1. The former concerns a feasibility study for a bagasse paper mill, the latter deals with the improvement of solar salt production and refining.

The local consulting profession in developing countries¹⁰

THE PROCESS OF economic development itself is what is most likely to foster the growth of strong consulting and advisory services in the developing countries. As industry and commerce expand and career opportunities increase, people will more and more enter these professional fields. While most are attracted to industry or government, some professionals in engineering, technology, economics, management and the like, will become consultants on account of their individual tastes and the opportunities that present themselves.

At the same time, the existence of a viable local consulting profession will stimulate the development process itself, and diminish the dependence of the developing countries on outside sources for certain forms of expertise which are in frequent demand. Not only does experienced consulting talent provide industry with short-term specialists, but the feedback of staff from consulting organizations to high posts in industry is an expected and valuable function of these organizations.

There is no conflict between the growth of the local consulting profession and the permanent role that belongs to international consultants in the development process. Very often, the supply of foreign consultants is inadequate, and there are certain activities for which their services are inappropriate and too expensive. Foreign consultants are often better equipped for handling complex problems and for serving large specialized industries, for they can readily assemble teams of experts who have acquired a wide experience in a number of countries and have a thorough knowledge of world markets and up-to-date technology.

On the other hand, local consultants having an intimate knowledge of

¹⁰ Parts of this chapter are based on a paper prepared by UNIDO with the assistance of Stanley C. Hollander, entitled "The use of industrial consultants in developing countries", presented at the International Symposium on Industrial Development, Athens, December 1967.

Technological services

THERE ARE MANY cases in which, although the basic technology is known, systematic investigations must be carried out to determine how far it is suitable to specific conditions. It may be necessary to select the most suitable raw materials, the most effective process steps, the types of processing equipment needed, or to evaluate the practical utility of a product. In other words, the consultant cannot make an immediate choice on the basis of his direct experience; he must investigate certain alternatives to determine the most favourable combination of raw materials and process for a desired end product. Such investigations are classified under the heading of industrial research and development. When the technical programme is conducted by an outside organization, i.e., a consultant, the activity is often called "contract research".

This small-scale investigation of the technical feasibility of a proposed operation may be necessary for several reasons. In the first place, the raw materials under consideration may be different from those used elsewhere and it may therefore be difficult to tell whether they will yield the desired product. Secondly, because of these differences in raw materials, the manner in which they will behave during processing cannot be ascertained with certainty. Operations may therefore have to be performed in order that the results may be compared quantitatively. Finally, because the raw materials often differ from those used previously, and because the processing method may require changes, the end product often differs considerably from that manufactured elsewhere. It is therefore necessary to evaluate how far it is suitable to the local market. The development or adaptation of technology is usually studied at first in a laboratory or, in the case of mechanical-electrical products, in a model shop. After the major questions have been answered by small-scale experimentation, the work is expanded to a pilot plant or even carried on on a commercial scale.

Investigations of this character often fall within four general headings:

(a) The study of local raw materials from which valuable constituents may be extracted for certain uses, such as the preparation of industrial

fibres from plants, recovery of products from metallic or non-metallic ores, or the production of foods from plant or animal products;

(b) The adaptation of general processing techniques with a view to recovering valuable constituents from raw materials in practical yields and at economic cost;

(c) The development of new uses for available local raw materials;

(d) The formulation or design of products to meet the specific needs of the market in the country, including adaptation to local conditions or situations.

Generally, the basic technology will have already been developed, and the task will consist in evaluating that knowledge systematically in order to determine the procedures which yield the best results.

The literature on such processes is extensive and the volume of work throughout the world is increasing at a very rapid pace. The primary need of developing countries at this time is to use existing knowledge effectively. This encourages the orientation of technical resources towards the solution of specific problems which benefit the country, and avoids the risk of duplicating work that has been done elsewhere.¹⁵

PRODUCT AND PROCESS DEVELOPMENT

Although consultative assistance in the development of products and processes is frequently used in industrialized countries to accelerate technical changes, it is less commonly resorted to in developing countries. The necessity to introduce new industrial operations rapidly acts as a strong incentive for the adaptation of existing technology.

In industrialized countries, most of the product and process development is carried out by individual enterprises in their own laboratories. Nevertheless, these countries make advantageous use of outside research and development organizations. This is particularly the case when an enterprise thinks it is not familiar enough with an industrial sector it wishes to enter. In undertaking such projects, it can either recruit technical personnel with the proper background and experience, or use an outside consulting research organization.

In developing countries, on the other hand, few individual enterprises have their own laboratories, and whenever they encounter problems they have to turn elsewhere for help. Often one of the first sources of technical assistance is an industrial research institute. A major aim of

¹⁵ Because of the large number of inquiries from developing countries received by UNIDO, an office of Industrial Information Services has been set up. This office serves anyone who has questions connected with industrial research.

such organizations is to adapt known technology to individual problems in the industrial community. But even before such organizations come into being, university faculty members with specialized experience often serve as technical consultants and carry out work in their own laboratories.

As time goes on, a country's essential needs for products will be satisfied to a considerable extent by the construction of plants in accordance with known technology. But even up-to-date plants must sooner or later adopt new or modified technical methods in order to be able to utilize new sources of raw materials, adapt processes to changed conditions, or produce different products to meet customer needs. As a country's technical skills and experience develop, more innovatory approaches to this type of project can be undertaken by local technologists, including industrial research institutes and consultants. These changes in product and process, however, largely amount to no more than the adaptation of information from abroad. The local technical personnel use the information effectively because they are familiar with the specific requirements in their countries. The use of foreign technical consultation may also be considered, but it may be expensive and, moreover, the foreign consultant may lack knowledge of local conditions.

SUCCESSIVE STAGES OF EXPERIMENTATION IN THE DEVELOPMENT OF NEW PRODUCTS AND PROCESSES AND THE ADAPTATION OF KNOWN TECHNOLOGY

One of the most important principles of product and process development is that experimentation should be carried out in the most rapid and inexpensive way possible. The first stage in an investigation should thus be exploratory—on the small laboratory or model-shop scale. With time, the size of experiments should gradually be increased.

In practice, a large project can be broken into a certain number of different stages at which evaluations can be made. This makes it possible to determine whether the results are promising enough for larger-scale work to be carried on. These stages, which are summarized below, are recommended when the product or process is so new that there is some danger in moving ahead too rapidly. On the other hand, when the product or process is the result of the adaptation of known technology, it may be possible to pass directly from laboratory work to full commercial operation.

The type of evaluation justified at any given stage is illustrated in the accompanying chart. As the scale of work increases and the amount of information becomes larger, more positive judgements and recommendations are warranted.

EVALUATION OF PRODUCT DEVELOPMENT PROJECTS AT SUCCESSIVE STAGES

	Product	Process	Market	Management interest	Raw materials	Facilities	Manufacture	Financial estimates	Legal and patents
Applied research	Preliminary characteristics	Preliminary evaluation	Probability of demand	Conformity with objectives	Initial selection				
Product development	Initial specifications	Basic outline	General character		Preliminary definition	Initial concept		Rough estimates	Preliminary study
Process development	Possible modification	Initial description			Initial specifications	Preliminary description	Initial evaluation		
Product evaluation	Performance review		Specific opportunities	Confirmation of interest				Revised estimates	Initial evaluation
Process confirmation	Possible modification	Final process design			Final specifications	Final description	Confirmation of feasibility	Semi-final estimates	
Market confirmation	Final formation		Confirmed opportunities						
Comprehensive review	Final specifications	Final specifications	Marketing plan	Co-ordination of review	Firm specifications	Firm specifications	Manufacturing plan	Final estimates	Final confirmation
Management decision				Decision to commercialize					
Commercialization	Consultation	Consultation	Marketing mobilization	Co-ordination	Procurement	Engineering and construction	Manufacturing mobilization	Financing	Contracts licenses patents

Applied research. This type of work involves the systematic study, on a laboratory scale, of the quality of available raw materials, the way in which they behave in processing, and the properties found in the final product.

Product definition. From the information collected by means of exploratory research, a detailed examination of the variables may be made and the product described in terms of tentative specifications. These should include those properties that are desired by the market.

Process definition. The information known about the process is then systematically analysed on a small scale to select optimum operating conditions. These conditions are summarized in the preliminary definition of the steps to be carried out on a commercial scale.

Evaluation of product properties. Even after the product has been given preliminary specifications, its suitability should preferably be confirmed by a systematic study of its behaviour under conditions of use and in comparison with competitive products already on the market. Such a study should take into consideration the relative costs of the proposed new product compared with those of products already available. Since, however, these analyses and utility tests are done internally in an atmosphere likely to favour the proposed new product, it is essential to get unbiased opinions from potential customers. As regards industrial products, small samples are submitted to selected potential customers so that they may evaluate them in their own laboratories or use them in small plant trials. With respect to consumer products, it is customary to use either outside test panels representative of potential customers, or to conduct a market survey.

Process confirmation. If the evaluations are favourable, a more elaborate examination of the process and of the economics of production on a commercial scale is justified. Such studies are carried out by development engineers on a pilot plant scale, as well as by process engineers who make a detailed flow sheet of process and prepare estimates of plant investment and operating costs. These data provide the tentative basis for the managerial decision to proceed with the commercial plant.

Confirmation of marketability. Before an enterprise decides to install a plant, it may be necessary to obtain more direct evidence that the product is salable. It is often possible to obtain satisfactory evidence of marketability in the form of purchase contracts without offering the product for sale. Sometimes small quantities may be offered for sale to actual customers. The preceding stages may have been carried out by a consultant. But at this stage the marketing personnel of the client enterprise should be involved directly, because product sales is the responsibility of the enterprise itself.

Comprehensive evaluation before commercialization. As a final step, the client should review all information relating to the project, including availability of raw materials, the process feasibility, the over-all economic conclusions regarding manufacturing costs and marketing policy, and the conformity of the entire project with the objectives of the enterprise.

OTHER TYPES OF TECHNOLOGICAL SERVICES

INFORMATION SERVICES

Since much of the essential technological information needed in developing countries already exists, it is an important function of a consultant to seek out, digest, and summarize the available documentation in usable form. One of the first activities of a technical centre, such as a local industrial research institute, is to collect a library and staff it with skilled personnel. The organization often issues general summaries of technical information as part of its public service. Sometimes it may prepare periodic digests relating to the technology of a specific industry, in which case the cost may be borne in part by an industry association. In addition, it may prepare detailed studies on individual subjects submitted by clients. Finally, the library and file of the institute may be invaluable for the initial survey of available technology for a new research and development project.

QUALITY CONTROL AND TESTING

Many enterprises in developing countries do not have the necessary equipment or skilled personnel to carry out analyses and tests on raw materials and products and such information must often be obtained from elsewhere. Most industrial research institutes have an analytical and testing section which provides such services.

STANDARDIZATION

Most developing countries find it desirable to establish quality standards for manufacturers. This protects the consumer's interest and meets the requirements of export markets. The development of standard specifications and the testing of samples is sometimes undertaken by government agencies. Often, however, with government encouragement, such functions are a quasi-public activity under the sponsorship of a membership association. The association may not have laboratory facilities for testing, but may co-operate with an industrial research institute or other technical organization which has such facilities. The cost of the preparation of standard specifications is normally supported by the association, but the testing is done at the expense of the individual enterprises which submit the samples.

TECHNICAL SERVICES TO SOLVE MANUFACTURING AND MARKETING PROBLEMS

Most medium- and large-size firms in the industrialized countries have their own laboratory facilities and staffs which solve short-term production problems and handle the customers' queries. But in the developing coun-

tries, many enterprises are unable to handle such technological matters and call upon local consultants or industrial research institutes to help them find practical solutions.

RAW MATERIALS STUDIES

Industrial development programmes in the newer countries frequently depend on the upgrading of raw materials resources. These include both natural resources of mineral origin and renewable resources of plant or animal origin. They must be assessed from a broad techno-economic point of view.

Techniques for evaluating mineral resources have become highly developed owing to the growing need to locate sources of raw materials. The specialized methods used in the exploration of crude petroleum are a noteworthy example.

A mineral survey is an investigation of the quality, quantity and availability of ore deposits. Special methods have been developed to assess the extent of reserves. Quality is determined by the analysis of the content of the desired constituents and the composition of the concentrates that can be obtained on a practical scale. The amount of ore available depends on the workability of the deposit. Mineral surveys require the specialized skills of geologists and mining engineers with experience in such surveys in various parts of the world.

RENEWABLE RESOURCE UTILIZATION

The economies of many developing countries are based on agriculture. The rural populations of these countries are frequently engaged in subsistence agriculture and have a comparatively low standard of living. In some countries, vigorous efforts have been made to devise methods for improving the yields and quality of the crops as well as the productivity and grades of livestock.

Consulting services are often used to improve agricultural products, since greater attention to collecting, pre-processing, and transportation can reduce mechanical and spoilage losses. New and better techniques and methods have been developed by technologists and economists to improve operations. Proper use of these methods can help increase farm productivity and raise the level of nutrition in the developing countries.

BY-PRODUCTS AND WASTE UTILIZATION

Studies to convert by-products and wastes into useful products have always been of great interest. Not only do they provide additional income that makes the main process more profitable, but the idea itself of converting

cost-free raw materials into valuable products is very attractive. When such projects are successful, they can yield impressive results. The manufacture of paper products from agricultural wastes and the petrochemical industry based on petroleum by-products are good examples. (See the bagasse paper mill case study in Annex 1.)

That being so, much unproductive effort is spent on projects which are not subject to adequate techno-economic analysis, for, while the technological principles for the conversion of wastes may be sound, the economics of the conversion may be unsound. For example, the quantity of waste or by-product may be too small to justify a new operation. Although the initial amount may be adequate, subsequent changes in the principal operation may reduce it radically or change its composition. Unless all these aspects are evaluated carefully in advance, much effort may be spent before the basic assumptions about the availability of suitable materials are recognized as being unsound.

CHAPTER 10

Economic services

THE ECONOMIC SERVICES of consultants to developing countries cover a wide range of activities designed to foster economic and industrial growth. These services include surveys of the entire economy of a country or region with a view to determining the development of general economic or industrial plans, the evaluation of existing plans, industrial surveys to discover possibilities for the creation of new or expanded industries, studies of the investment climate and ways of promoting investment in industry. At the project level, consultants frequently evaluate technical and economic feasibility, as well as the "bankability" of a project in order to attract and justify financing.

OVER-ALL ECONOMIC PLANNING

Some over-all economic plan in which economic and social objectives can be expressed as specific tangible targets and formulated into budgets and policies is indispensable, whether planning starts "from above" (i.e., a paper plan relating to aggregative variables and parameters) or "from below" (i.e., a shopping list for specific projects).

A number of countries ask consultants to appraise resources and development potential for long-range perspective plans, and to establish priorities among feasible programmes. In some cases, consultants prepare a plan on the basis of modern economic techniques. Their ideas often stimulate the thinking of local staff and clarify points to be worked out in operational plans and policies.

Many governments hire consultants to develop the proper organizational planning activities. This includes not only matters relating to the organizational structure and functional staffing of planning organs, but also the development of an appropriate information system for scientific planning. More specifically, the establishment of good national statistical

programmes is of vital importance to planning, and with the growing trend towards economic co-operation among neighbouring countries, the need for internationally comparable statistical systems is increasing.

INDUSTRIAL DEVELOPMENT PROGRAMMES

The economic growth of a developing country entails no less than the structural transformation of the country, both from an economic and social point of view, with increasing emphasis given to the development of the industrial sector. Inasmuch as the expansion of that sector involves the creation of new industries, the proper adaptation of experience gained in more industrialized countries is of decisive importance. Consultants play an important part in surveying industrial opportunities and in formulating industrial development programmes.

In the centrally planned economies, industrial plans serve as a detailed and specific guide to the organs controlling investment and production in the various branches of industry. The industrial plans of countries with mixed economies comprise many "soft" or "indicative" elements on which the government exercises its influence indirectly, through monetary and fiscal policies, trade incentives and regulations, the establishment of industrial estates, etc. Experienced consultants frequently study these matters.

Consultants often make industrial surveys to evaluate the structure and performance of existing industries and to find out the key production possibilities and requirements for appropriate government action. Concurrently with the formulation of such industrial plans covering the whole industrial sector of a country, consultants often advise on industrial policies and regulations relating to the implementation of the given plan. This may include a review of the fiscal system, foreign-exchange regulations (including pioneer industry ordinances, nationality of ownership, employment of expatriates, etc.), nationalization policies, labour laws, as well as government investment programmes pertaining to specific infra-structural requirements (including industrial sites, industrial research facilities, industrial financing institutions, investment and productivity centres, etc.). Moreover, consultants can give advice on the incentives necessary to attract foreign capital and know-how and draft an investment guide for potential investors.

TECHNICAL AND ECONOMIC FEASIBILITY STUDIES

The study and evaluation of individual projects and commodities should be undertaken by industry specialists within the framework of the national development programme and sector analysis. One of the major planning activities usually undertaken with the assistance of consultants

conditions at home are best suited to solve less complex problems, particularly in small- and medium-scale industries. Moreover, many small clients are not able to find an international consultant, nor are they able to pay the travel costs and *per diem* expenses involved. The local consultant can thus develop a completely new market, by providing consulting services to small clients in his own country.

Frequently, local and foreign consultants can supplement each other's efforts. In some cases, large international consulting organizations are represented by a local consulting operation and co-operate on assignments in a particular country or group of countries. Sometimes local and foreign consulting organizations join forces on a single venture in which their services are complementary. Another arrangement is that whereby part of an assignment is subcontracted to local consultants or their services are hired directly. Some countries require that a certain percentage of the professional staff be of local nationality.

Such forms of co-operation have many advantages. For the international consultant, these advantages lie in the fact that their local associates know the language, business customs, fiscal and legal problems, etc., of their country. They have contacts with local officials, businessmen and professionals and can search out projects in advance of public notice. They are able to acquire sites and buildings and to recruit key local staff. In general it is less expensive to use local engineers, technicians and the like because they do not need subsistence allowances or international transportation.

Local consultants, on the other hand, benefit in other ways. They gain valuable experience and training while working on projects in co-operation with international experts. Such co-operation enables local consulting organizations to work on projects which they may not be experienced or specialized enough to undertake alone. In addition, the backing and reputation of an international consulting organization enhances the prestige of local consultants. The organization also provides them with an established channel for obtaining expertise not available in their own countries. In all these ways, then, local consultants play an important role in bridging the gap between local industries and foreign consultants.

THE DEVELOPMENT OF THE LOCAL CONSULTING PROFESSION

There are a number of factors which influence the growth of local consulting services. Among these are the opportunities for training in industrial research, the level of remuneration in comparison with other professions, and the stimulation provided by professional societies, journals, meetings and seminars.

is the study of national economic plans and the evaluation of commercial profitability of individual ventures at the stage of project formulation and evaluation.

It is to be noted that one of the prerequisites for a sound feasibility study is the existence of a sufficient range of alternative possibilities formulated for comparative evaluation.

Since financial limitations constitute a vital factor in planning, financing should be examined simultaneously with technical and economic feasibility. Even when a domestic currency budget has been established, the sources from which capital goods and technical know-how must necessarily be obtained and the consequent strain on the nation's foreign exchange must be carefully investigated.

BANKABILITY

The preparation of an investment prospectus is often necessary to obtain foreign or domestic capital, whether from private sources, government funds, other governments, or international agencies. Most of the time, these analyses should be made by independent, unbiased groups. Consultants are often acceptable both to the establishment or country concerned and to those who are to supply the capital. Although the findings are essentially based on feasibility studies, they show the prospects for pay-out or return on investment in terms acceptable to financial experts.

Financial limitations may be of vital importance when considering other aspects of a project such as the size or extent of mechanization, in which case financing must be examined simultaneously with the rest of the project, and not afterwards. In addition, from the private entrepreneur's standpoint, the financial evaluation must provide data on net return on invested capital, and hence determine the volume of credit and interest rates.

CHAPTER 11

Management services

IN THE INDUSTRIALIZED countries, there has been a remarkable development of new concepts relating to management practices in both private and public sectors. Consultants have helped managers to analyse and solve management and related operating and technical problems. The development of almost every accepted technique—work measurement, payment systems, plant layout and materials handling, systems analysis, market research, production planning and control, budgetary control and the like in connexion with the use of electronic computers—has been the joint work of consultants and industrialists.

The same is true of the solutions that have been worked out for the many and varied operating problems in the principal areas of industry. Consultants have made distinct contributions to such central problems of managing a company or organization as the design of the operation, the establishment of goals, industrial organization, the upgrading of managerial skill, the management of employee relations, innovations, and keeping the organization abreast of the economic, social and political environment in which it functions.

In many developing countries, government agencies and private enterprises have engaged consultants to survey the organization and operating policies and practices pertaining to various activities. The increasing demand for management services in developing countries is largely due to the growing burdens imposed on managers in recent years. Factory managers in particular face a variety of managerial, operating and technical problems posed by a rapidly changing world, and consultants help them cope with these problems.

Since political and economic changes often alter the size and attractiveness of foreign markets, marketing and distribution practices must be reshaped continually in order to sell new products in new markets. Ideas of how best to plan, operate, and control a factory must keep pace with rapid development in the newer economies.

Managerial problems are one of the toughest and most pressing

obstacles confronting development programmes in developing countries. Even though a country may be able to import modern equipment and modern technology and to employ foreign personnel if local resources are insufficient, poor management may completely annul all such efforts. Management consulting services are thus vitally important because they help local personnel acquire the technical knowledge, skills, and tools they need to fulfil their critical roles in economic development programmes.

Under the stress of change, many industrial establishments lack the time or skill to deal with the above problems by their own means. Moreover, the internal differences of opinion about how to plan an organization's future in a changing world sometimes force managers to seek independent opinions.

In the sphere of management, the consultant's activity is not confined to solving problems in a purely theoretical, abstract, or technical sense. The consultant does these things, of course, but the problems with which he deals are action-oriented. His thinking must be directed towards improving managerial and economic performance and obtaining results for the client. The most important function of the consultant consists in urging and persuading clients and, when necessary, helping them adopt a sound course of action.

THE NEED FOR MANAGEMENT SERVICES

The various services for which management looks to outside counsel can be classified according to the degree of responsibility the consultant assumes with respect to the company problems. At the first level, the consultant may be asked to give an independent opinion, or to provide information which management needs to reach a decision. At the next level, the consultant may supplement the client's efforts with his specialized knowledge, skills and know-how. Even more important is the consultant's organizational function, which consists in improving methods, structures and procedures in order to place the organization in a better position to solve current problems as they arise. Finally, the most general of all consulting services is the auditing service, which enables the consultant to discover and analyse any problems encountered in the course of a general review of activities. This puts management in a better position to spot incipient difficulties and take corrective measures before serious consequences arise.

No less important than management audit is the general review of operations by consultants at a time of top management change. The principal aim here is to appraise organizational strengths and weaknesses for the purpose of planning future growth. Consultants are also often called in when there has been a significant increase in an organization's

size, because major questions of financing, increased workloads, planning, more complex organizational relationships and communication problems become apparent as an organization expands.

Sometimes, outside assistance is needed because, though the problems are known, the time and talents to solve them are not readily available within the company organization itself. It may happen also that management suspects that there are problems to be solved and wishes either to discover them or be assured they do not exist. The true state of affairs can be determined only after a complete and objective examination by consultants, who take a broader view than those occupied with day-to-day operations.

Again, outside advice may be needed when management has tried and failed to solve a problem. Other circumstances often suggest the need for such help, e. g. a lack of familiarity with the problem, a desire to have fresh ideas or learn new techniques, or a conflict of views within the organization.

An increasing number of management problems in fully developed economies are of such scope and complexity that it is usually not economic to equip corporate staffs having the various skills that are necessary to solve them. These are the problems for the solving of which the consultant can be particularly helpful.

A less clear-cut situation is that in which management falls back on the consultant and expects him to reach decisions for it. There is no doubt that a thorough set of recommendations documented by facts and figures, such as a consultant usually submits, will influence the decisions taken by management, but the consultant's job is to recommend sound action and not act as management's deputy in taking action.

SCOPE AND TYPE OF MANAGEMENT SERVICES

GENERAL MANAGEMENT SERVICES

The services offered by consultants in the general management area in developing countries cover a wide range of activities, including studies of objectives, goals and policies, over-all business strategy, organization, cost reduction and profit improvement, and management development and compensation programmes.

PRODUCTIVITY STUDIES

This function has acquired considerable importance in recent years and is sometimes defined as the industrial engineering function. The purpose of such studies is the development of procedures for the most efficient use of facilities, manpower, and materials.

A first stage will very likely be a plant layout review to ensure optimum flow of materials and work. Very often production planning procedures must also be introduced. Time-and-motion studies are frequently made to ensure an efficient employment of the labour force. Inspection, standards, methods, and schedules are likewise established to reduce as much as possible the manufacture of products that do not conform to specifications. This is particularly important to prevent waste of raw materials. Safety measures are taken to diminish the number of accidents and training methods are developed to improve workers' skills.

PHYSICAL DISTRIBUTION

Many individuals and firms offer consultative services relating to distribution. Warehousing and materials handling, flow, storage, order picking, shipping, receiving, packaging, traffic and transportation studies, the design of the total physical distribution network, inventory management and control, order processing, the establishment of shipping documents and operating reports, and the determination and design of physical distribution equipment are among the services related to the control, movement, and storage of materials in the total system. In the developing countries, efficient physical distribution of export products is particularly important. Furthermore, as an economy expands, the problems of getting products to the consumer in the most effective manner become more acute.

MARKETING PROBLEMS

Marketing strategy and long-term planning, product line planning, marketing controls and procedures, marketing organization, compensation of marketing personnel, distribution methods and costs, sales management and method, market research, investigations to participate in new markets through agents, distributors, licensees, or joint ventures, search for affiliates, and international business intelligence all fall within this category.

ADMINISTRATIVE AND OFFICE PROBLEMS

Office layout and organization, work simplification, workload and staffing requirements, systems and procedures, clerical cost controls, quality improvement, filing systems and equipment, correspondence and reports and records management are the typical items that come under this heading.

ACCOUNTING AND FINANCIAL CONTROL

Chartered and public accountants often assist their clients in more ways than that of making an independent audit of accounts. In developing countries, many enterprises, particularly the smaller ones, lack modern cost accounting systems. Consultants may thus design and install accounting systems, including those for cost accounting, provide advice on financial policies, and assist in setting up better procedures. Among the training courses that are established locally, those to do with accounting are particularly popular and important. Improved accounting paves the way for more effective productivity analysis, production planning and control, and financial and budgetary control.

OPERATIONS RESEARCH

During the last two decades mathematical analysis has been increasingly used to find out relationships in complex industrial or government operations involving many variables. This function is sometimes called "operational research". The development of computers has enabled industry to handle large amounts of data necessary for reaching decisions.

In developing countries, operations research techniques can be used for analysing the allocation and utilization of resources. The amount of expert knowledge, the data required and the equipment needed can vary with a country's level of development and the know-how and experience of available personnel. Such forms of analysis as "critical path methods" (CPM), "programme evaluation and review techniques" (PERT) and simulation are coming into use.

ELECTRONIC DATA PROCESSING

The principal data processing problems studied by consultants relate to the suitability of existing systems, integration of data flow, computer feasibility studies, equipment specification and selection, cost and quality control, organization and staffing requirements and training of personnel.

Two examples on how management services have been used in the developing countries are given in Annex 1. Case study No. 5 relates to a manufacturing company that thought its production and marketing activities could be improved; case study No. 6 explains the assistance given to a large manufacturing firm in which the production costs were too high.

*Training programmes**

ONE OF THE IMPORTANT functions of consultants is the establishment and implementation of training programmes at all levels, relating to general management, specialized departments, first-line supervision and production operations. Training programmes for management sectors or for increasing production skills and crafts may be of the classroom type, pre-start-up training type, on-the-job training type, or all three.

In the developed countries, executive training programmes are often established and carried out by individual management consulting firms as well as by certain universities. They are specifically designed for training executives in management or finance. Such training programmes improve the organizational abilities of executives or acquaint them with new management techniques. Sometimes, these programmes are directed by an expert, and both trainer and trainee work together on specific case examples which simulate on-the-job training.

Training programmes are also established at the plant foremen's level and may take place in the plant or on other premises. Such programmes may cover both technical and human relations in a specific industry such as textiles or cement, or may apply to a variety of industries, and relate to such matters as the improvement of working conditions, such as plant safety or foreman-worker relations. Generally, specific cases are studied in the course of these discussions. Various solutions or possible courses of action are put forward by the participants and their advantages and shortcomings are pointed out.

Training programmes may also cover technical matters, such as the operation of a production unit. Demonstration models, cut-out specimens of equipment and similar devices are generally used for instruction. Certain devices or simulators comparable to plants or working models, which are meant to show the operation of vital equipment parts or their controls, have been developed for some industries.

* This chapter is based on material prepared by Sandwell and Company Ltd. of Vancouver, Canada, specializing in pulp and paper and used on an actual project in this field.

The foremen and workers of a newly established plant may receive technical training either before or after erection and commissioning of the plant. Engineers, foremen and key workers are frequently hired while the plant is under construction. They thus acquire a good on-the-job training which is extremely useful for the future maintenance and upkeep of the production and auxiliary facilities. The training of process operators also can be undertaken while a plant is in the erection stage, because they may be hired and take part in the operation of a similar facility abroad.

Training may also be given after a plant has become operational in order to improve the skill and efficiency of foremen and workers. This may be particularly valuable in countries where the industry has just been established and workers have to undertake new functions.

Procedures

Most industrial enterprises operate with a series of standard procedures, many of which are set down in writing and distributed to key personnel in book form in order to ensure that all corporate activities are carried out in the same way. The written standard procedures, or manuals, usually include :

(a) Quality specifications which state the measurable characteristics of the company's finished products, as well as those of the end products of each process step ;

(b) Raw material specifications ;

(c) Manufacturing specifications, which state the quantity (and quality) of raw and other materials used throughout the process ;

(d) Operating manuals, which give detailed descriptions of each step in the manufacturing process and the manner in which it is to be carried out ;

(e) Organization charts and job descriptions, which specify the number and type of people required to operate the enterprise and the duties and responsibilities of each ;

(f) Standard practice manuals, which describe everything that is necessary to make the organization function and deal with such things as company rules and regulations, procedures for purchasing, hiring, or for various interdepartmental activities.

It will be necessary for all the foregoing procedures, specifications, and manuals to be prepared before the start-up of the mill. Thus, all the key personnel will be familiar with them enough in advance of start-up to enable them to train others.

General assignment of training needs

Training needs are in general the following ;

(a) All foreign key personnel who do not speak the national language should learn it sufficiently well to carry out their jobs of supervising the mill operation and training national personnel to carry out operating details ;

(b) All key personnel should develop the procedures, specifications and manuals mentioned in the preceding paragraphs and then train others to apply them ;

(c) All key personnel should be thoroughly versed in training methods and techniques.

Training programme

In order that a training programme might satisfy the needs outlined above, it is necessary to establish a schedule or time-table so that all essential needs may be met when a plant is set up. The schedule is based on broad estimates of the time required to prepare for start-up and is related to manpower mobilization schedules. These schedules show the key personnel, foreign or national, who would have to follow a special pre-start-up training programme and who would subsequently be required to train others. Details of the training programme as it affects superintendents, foremen and operators are outlined below.

Language training

Successful management depends on a two-way communication throughout an organization. All key foreign personnel from superintendents to operators must therefore learn the national language in order that a sufficient degree of communication might be established.

To that end, a programme should be devised for teaching the national language which might include the following :

(a) Issue of a short dictionary of essential terms to each foreign employee as soon as he is engaged.

(b) The use of interpreters on each shift during the first few months of operation. The interpreters also act as teachers during off-shift hours for scheduled courses of instruction in the national language.

In addition to the above, consideration should be given to paying a financial incentive to those who achieve proficiency in the language ; it is sometimes provided that those who already know the language will receive the bonus on starting employment. Several sets of the national language should be made available and, whenever possible, sets should be issued to employees as soon as they are engaged.

TRAINING OF SUPERINTENDENTS

It is necessary for the key personnel to develop, among other things, the required procedures, specifications and manuals for a mill, and having done so, train others to apply and use them. Since the preparation of such material has an educational value in itself, it should be included in the training programme. On account of its importance, the work is assigned to the superintendents.¹⁶

SPECIFICATIONS

By specifications is meant a wide range of measurements or standards expressed in numerical form. Indeed, it is only by working with clearly defined specifications through every step of the process that management can assure consistency of quality, high mill efficiency and maximum output.

OPERATING MANUALS

While specifications are set out in numerical terms, operating manuals provide written descriptions of the manufacturing process which enable operators in all departments to control the process correctly. It follows that the manuals must be completed sufficiently in advance of the start-up of the plant to train foremen and operators in all operating procedures.

Since the task of preparing manuals is quite exacting, superintendents should be given as much assistance as possible in their preparation. This includes :

- (a) Copies of similar instruction manuals from other mills ;
- (b) Assistance in procuring data from equipment suppliers ;
- (c) Access to correspondence and equipment specification files at the site ;
- (d) Specifically prepared lists showing all the equipment under the control of each operator ;
- (e) Copies of design flow sheets and general arrangement drawings ;
- (f) Specially prepared flow diagrams and/or piping drawings prepared for use as illustrations for the manuals ;

¹⁶ The term "superintendents" applies to all department heads reporting to the Mill manager, and, in most instances, to those with the title of Assistant superintendent. The word "supervisor" is merely a common term which describes anyone who supervises the work of others.

TRAINING

In the first place, good basic programmes in business administration, management sciences, engineering, chemistry, and other industrial branches which are appropriate for the training of operating and staff personnel are also appropriate for potential consultants. This fundamental training should be supplemented by direct experience in industry in order to increase the consultant's technical skills and to train him to be an advisor. No particular institution or training arrangement can meet all of a country's needs in this respect.

Training at the university level

These institutions will have to provide courses leading to degrees in essential subjects. They may also organize special courses, refresher programmes, and training seminars. Some observers are of the opinion that, in most countries, management and engineering institutes function best outside the universities, because university faculties exercise a traditional control over curricula and are averse to innovations. Whether this is true or not will depend on the local situation. But if special institutes are established, they should be made to rank with the universities as quickly as possible.

Another point to be decided is whether future consultants should go to schools in the developed countries and whether they should be sent for the study of basic programmes or for supplementary and graduate work. The answer depends on the extent to which local facilities can meet the needs. Some international educational exchange is always desirable and should be encouraged. One of the problems raised by the use of overseas facilities, however, is to see to it that the trainees return to their homeland for practice. Whenever demand and resources warrant it, the best long-run solution is the establishment of domestic institutions.

Some schools and universities have worked out both ordinary and advanced programmes which provide for management games, internships in industry, the study of cases and practical problems, etc. An interesting programme was developed jointly by the University of Ceara in Brazil and the University of California at Los Angeles (UCLA) in the United States. A group of twenty Brazilian and U. S. nationals spent three months in Brazil's north-east development area in connexion with the UCLA courses. The group was divided into small teams comprising nationals of both countries, which began by interviewing local consumers, farmers and businessmen in order to ascertain what the local opportunities were and then to plan industries. As the plans matured, support was solicited from the development bank and from local investors. Several businesses have already been established and the groups gained considerable practical experience.¹¹

¹¹ Morris Asimov, "Project Brazil: A case study in micro-planning," *International Development Review*. Vol. 6, June 1964, pp. 26—28.

(g) Assistance in editing the text from the point of view of drafting and particularly to make sure that it is in conformity with the design concept ;

(b) Printing and distribution of the manuals.

In general, it is good policy to assist superintendents in the preparation of operating manuals. The superintendent, however, should be given full responsibility for them and should approve them before they are finally printed and issued.

ORGANIZATION CHARTS

Organization charts list the personnel necessary for each phase of the operation and at the same time show the lines of authority by which the operation is controlled. Tentative organization charts are prepared to estimate manpower requirements and costs. These are to be reviewed and sometimes revised by the superintendents to suit the procedures outlined in the operating manuals. Such charts are designed to serve as a standard for manpower control, for cost budgets and for cross-referencing job descriptions.

JOB DESCRIPTIONS

Job descriptions relate the organization charts to the operating manuals and describe the duties and responsibilities of each individual in relation to the process. Job descriptions are of two essential types. The first describes the duties and responsibilities of supervisory personnel, while the second, usually referred to as job "breakdown", describes the specific step-by-step duties of operators.

Superintendents prepare descriptions of their own and their foremen's jobs. A typical job description of a superintendent is given at the end of this chapter.

STANDARD PRACTICES

A Standard Practice Manual records company policies and office and paper work procedures. The standard practice sheets are prepared as required, mostly by the superintendents of service departments.

INSTRUCTION TECHNIQUES

In general, superintendents are responsible for training their foremen and operators. To assist them in fulfilling this responsibility, a short instruction course should be organized on the techniques they could usefully apply in training others.

TRAINING SCHEDULE

A training schedule for superintendents should be developed on the basis of the schedule for the preparation of the various standard practice manuals discussed above. Subsequently, more detailed schedules allocating responsibilities somewhat more specifically may be prepared and issued.

GENERAL ASSESSMENT

It follows from the above that the training programme of superintendents consists primarily in establishing a detailed work schedule which they should carry out before the start-up of the mill. In fact it is a programme of self-training, involving a minimum of classroom type activity but maximum practical assistance and guidance.

The following is a tentative list of the material required and a tentative assignment of responsibility for its preparation.

List of written material to be prepared by superintendents

<i>Item specifications</i>	<i>Responsibility</i>
Product specifications	Chief chemist
Raw material specifications	Chief chemist
Manufacturing specifications and furnishes	Chief chemist and Mill superintendent
Testing procedures	Chief chemist
<i>Operating manuals</i>	
Digesters	Mill superintendent
Brown stock washers and screens	Mill superintendent
Bleach plant	Mill superintendent
Bleach liquor preparation	Mill superintendent
Bleached stock washers	Mill superintendent
Lime kiln	Mill superintendent
Causticizing plant	Mill superintendent
Pulp driers	Mill superintendent
Wood preparation plant	Mill superintendent
Power boiler	Steam and power superintendent

Turbines	Steam and power superintendent
Evaporators	Steam and power superintendent
Electrostatic precipitators	Steam and power superintendent
<i>Organization charts</i>	All superintendents
<i>Job descriptions</i>	Superintendents and foremen
<i>Standard practices</i>	Mill manager, superintendents and foremen

TRAINING OF FOREMEN

GENERAL

Foremen of the operating departments should familiarize themselves with those parts of the plant for which they are to be responsible. In addition, they have to learn the national language as much as possible and integrate themselves into the mill organization. Whatever their individual skills and experience, all foremen should take part in an intensive training programme. The object of this programme is to create an "operating team" capable of offering assistance in instructional techniques.

In order to familiarize themselves with the mill more readily, foremen should assist the engineers in checking all the equipment of the mill before start-up.

PROCEDURES

In order to become properly integrated into the organization, the foremen should receive and study the standard practice sheets as they are issued. They might also receive classroom instruction in certain more complex practices. All supervisory personnel should be provided with appropriate loose-leaf binders for keeping their standard practice sheets and for ready reference.

INSTRUCTION TECHNIQUES

The major responsibility for training operators before the mill start-up is assigned to the foremen. To assist them in this work, it is necessary to conduct a course in instruction techniques. A specialist is sometimes sent to conduct courses for both foremen and operators as well as for superintendents.

GENERAL ASSESSMENT

The mobilization schedule for foremen and for operators is generally such that the training of foremen is inextricably bound up with that of the operators. Some of the techniques proposed for operator training contribute in fact substantially to the training of the foremen themselves. These techniques are discussed briefly in the following paragraphs.

TRAINING OF OPERATORS

The amount of experience possessed by those engaged as operators necessarily varies considerably. Some will have a good deal of applicable experience, while others will have little or none. In all cases, each operator will have to learn a number of things for the first time. Since it is impossible to provide individual training so as to teach each operator only what he does not know, experienced trainees will have to consider some of their training as a review of previously acquired knowledge. The advantage of such a review is that it will enable the more experienced trainees to know exactly what the training course covers for the benefit of those with less experience. In order to maintain the experienced operator's interest in the undertaking, he may be asked to take part in the training activity wherever his knowledge may be useful to others.

The most effective training method is on-the-job training. As illustrated below, the left-hand column indicates the amount of knowledge retained by a trainee after following the instruction method listed in the right-hand column :

<i>Knowledge retained (per cent)</i>	<i>Method of acquiring knowledge</i>
10	Reading (instruction manuals)
20	Listening (lectures)
30	Seeing (movies, demonstrations)
50	Hearing and seeing combined
70	Being required to recite his knowledge
90	Doing things (on-the-job training)

If a plant is not in the operational stage when the training programme begins, on-the-job training cannot be undertaken. Instead, it is necessary to make the best possible use of all other available training techniques. Consequently, the training programme may consist of the following :

- (a) Classroom instruction based on the operating manuals ;
- (b) In-plant instruction to simulate on-the-job training ;
- (c) Observation of, and assistance in, the checking out of all mill equipment ;
- (d) Periodic testing to measure the degree of learning.

CLASSROOM INSTRUCTION

Classroom instruction very often occupies about 30 per cent of the training time. Most classroom time is devoted to discussion rather than instruction, so as to ensure maximum participation by trainees. As much as possible, trainees are required to tell one another and the discussion leader how their jobs should be done. These discussions lead to the preparation of detailed job breakdowns to supplement the operating manuals. Classroom instruction also includes courses to familiarize operators with the organization of the plant, company rules, regulations and procedures and other necessary matters.

IN-PLANT INSTRUCTION

The purpose of in-plant instruction is to relate classroom instruction to the operation. The operators place the necessary identification marks on valves, pipes and equipment to familiarize themselves with the plant and equipment for which they are responsible. Another means for that purpose is to have the operators observe and, where possible, assist in checking out equipment and cleaning out stock lines and the like before start-up.

TESTING

Testing procedures include the field checking of pipes and flows and the preparation of flow diagrams, as well as the use of questionnaires.

TRAINING OF HELPERS

The operators participate extensively in the training of their helpers, since such participation increases their own knowledge.

GENERAL ASSESSMENT

The object of the training programme is to form, before start-up, a team sufficiently qualified to ensure that the production rate and product quality reach the optimum level as early as possible. The principles of training outlined herein apply not only to equipment operation, but to product testing, equipment maintenance and to office and paper work procedures as well.

POST START-UP TRAINING

Training must be continued after start-up for the following reasons :

(a) Pre-start-up training is necessarily incomplete, because it is impossible to anticipate all process reactions and upsets ;

(b) The knowledge acquired cannot be completely sufficient, and it is necessary to review and supplement it ;

(c) The amount of knowledge retained decreases with time if the knowledge is seldom used. "Refresher" instruction is therefore indispensable ;

(d) On-the-job training of the national counterparts of the foreign operators is a continuing process.

A detailed programme for post start-up training is presented hereunder.

Suggested allocation of training time for operators

<i>Non-operating</i>	<i>Percentage of time</i>
Induction and orientation	10
Contingency for personal and family adjustments	2
Team development	5
Teaching skills	5
Policies and procedures	
Duties and responsibilities	3
Company and employee rules and regulations	3
Mill organization and inter-departmental relationships	2
Language	10
<i>Operating</i>	
Lectures	15
Assignments	15
Training	12.5
Pre-start-up equipment testing	10
Job breakdowns	7.5
	100.0

NON-OPERATING TRAINING

Induction and orientation

The induction and orientation of operators are regarded as a training process during which operators become acquainted with the objectives of the company, its organization and the functions of its departments, the key personnel, the geography of the plant, the principles of the processes used in their particular department, and also receive instruction in order to acquire a working knowledge of such components as instruments, valves and pumps. The relative importance of company policies regarding safety and housekeeping form a part of the induction and orientation programme.

Contingency

A small contingency time is allotted in the training programme to family problems which may arise in the case of national and foreign personnel entering a new environment.

Team development

Steps should be taken to ensure that operators arriving at the plant from a wide variety of backgrounds develop, as early as possible, a common sense of responsibility towards the success of the enterprise as a whole. To some extent, the development of such a sense of responsibility is a by-product of all parts of the training programme. It is not always clear how to develop this sense because the exact techniques used in developing "team spirit" cannot readily be defined. Much depends on the personality and enthusiasm of both national and foreign personnel. It is so important, however, that part of the training time should be specially reserved for that purpose.

Teaching skills

It is particularly important that foreign operators required to train their local counterparts should acquire the necessary teaching skills, though it is not always clear how much time should be devoted to this aspect of operator training before start-up. In general, the training of counterparts can be deferred until after start-up.

Policies and procedures

Operators must know their own duties and responsibilities and the limits of their authority to carry out alterations in the process, to draw materials, to initiate maintenance work, and so on. Some time should be devoted to the explanation of the various procedures used in carrying out the day-to-day activities of the company.

OPERATING TRAINING

It is suggested that 60 per cent of the available time should be used for direct training in operating matters. However, the various parts of such a training programme cannot be rigidly separated from each other and some training activities must serve at least a dual purpose. All possible training time must be used to develop a team spirit and a sense of responsibility. Accordingly, there will be some inevitable overlapping in training methods.

Lectures

Fifteen per cent of the total training time should generally be allocated to lectures, since that method, supplemented by "homework" reading assignments, is to be the starting point for teaching operators. Every effort must be made to provide visual aids to the lecturers in order to make the teaching more effective.

It is assumed that lectures will not be confined to the classroom, but that lecture-type instruction will be given in the plant itself. Actual equipment should be in place to familiarize the operator with all aspects of the work he is expected to do. The time allocated to lectures should be divided equally between the classroom and the plant.

Assignments

Since the combination of reading and listening to lectures generally results in no more than 35 to 40 per cent retention, steps must be taken to increase that amount by giving the trainees assignments to encourage them to find out things for themselves. This method serves to test the powers of retention of the trainees and shows how far it is necessary to give them more active training. Typical assignments might be the preparation or completion of flow diagrams or the answering of questionnaires. Operator-trainees with special skills might also be asked to help others to receive the necessary training. An important aspect of this kind of training is the fact that it is unsupervised and therefore releases instructors for other activities.

TYPICAL JOB DESCRIPTION

Title

Mill Superintendent (1/6)¹⁷

Function

To direct and control the operation of the mill, inclusive of the receiving, storage and preparation of wood and the loading of baled pulp into common carriers in accordance with predetermined production schedules and specifications as to quantity and quality, and at maximum profitability.

Responsible to

Mill Manager

Specific responsibilities

(a) Supervises and co-ordinates the work of an Assistant Mill Superintendent (4/1), two Woodyard and Wood Preparation Foremen (4/2), four Shift Foremen (4/3) and the Shipping and Production Co-ordinator (4/4), all of whom are responsible in turn for a total of 84 employees who carry out the function referred to above.

(b) Delegates to his immediate subordinates the responsibility for safety, housekeeping, production, product quality, the scheduling of men, allocation of duties, maintenance of inventories of chemicals and operating supplies, equipment maintenance, record keeping and all routine activities in connexion with the operation of the mill; when necessary assigns specific tasks; continually checks their performance and requires them to notify him of any event interfering, or likely to interfere, with planned production or maintenance activities.

(c) Reviews operating and other reports as often as necessary to evaluate production and quality performance and initiates action when deviation from standard or planned performance is shown to have occurred.

(d) Inspects the department sufficiently frequently to ensure that standards of housekeeping, safety, maintenance and production performance are being met.

(e) Presides over regular daily, weekly or monthly meetings to review mill production, quality and cost performance, and to identify causes of variation from standard and/or to review or initiate short- and long-range plans for changes in machinery and equipment, operating procedures, arrangement of materials, manufacturing or quality specifications, training of personnel or any other matters connected with profitability.

(f) Attends regular meetings to participate in periodic review of production, quality, cost of production, planning or other matters; meets weekly with the Wood Supply Manager or his representative to review wood inventories and to plan deliveries to conform to production schedules.

¹⁷ In the following paragraphs, the numerical references in brackets identify the job descriptions of each position shown.

(g) With the assistance of his immediate subordinates and representatives of mill service departments, prepares annual production forecasts and operating cost budgets.

(h) In conjunction with the Personnel Manager (1/10) provides guidance, when necessary, to subordinates in labour relations matters, participating in discussions with representatives of the employees when required.

(i) Ensures that the work force in his department is kept up to strength, that it operates in accordance with company policy and rules, and that it is properly trained; participates in negotiations with the trade union(s) where his department is concerned.

(j) Provides the Chief Chemist (1/5) with information or written reports for preparation of replies to customer complaints.

(k) Meets occasionally with suppliers of raw materials, supplies or equipment to exchange information about mill needs and new products.

(l) Meets with customers as required and in accordance with sales policy to exchange information about quality of product; initiates changes in manufacturing and quality specifications, if required, as a result of such meetings.

(m) Ensures that the Mill Manager is informed of all occurrences interfering, or likely to interfere, with the attainment of planned or programmed objectives.

(n) Performs such other duties as may be required.

Co-operates with

(a) Wood Supply Manager in connexion with wood supplies;

(b) Plant Engineer (1/8) in connexion with operation of the chemical recovery system, power and steam demands and maintenance scheduling;

(c) Chief Chemist (1/6) regarding product quality, specifications, fibre losses and technical problems;

(d) Office Manager (1/4) with reference to the provision of accurate data required for accounting purposes;

(e) Purchasing Agent (2/8) with reference to operating supplies;

(f) Personnel Manager with regard to employee welfare, company labour-management policies on training, transfers, discipline and interpretation of the labour agreement.

Training within industry

One way to learn consulting is by being employed, after university level training in engineering, economics, science, business administration and the like, in a staff or line capacity in industry. But a young man might learn more from several years of consulting practice under proper supervision and direction than from working in a single firm or agency. Moreover, the supply of able specialists moving out of industry into the consulting profession is limited. The prevailing national practices, customs, and systems of remuneration encourage lifelong tenure with the same employer. On the other hand, the client may want a consultant with actual plant or industrial experience.

In view of the fact that, in the developing countries, the number of engineers, technologists, economists, management and marketing specialists and the like with a wide industry experience is relatively small, a concerted effort to place younger men as interns with local or foreign industries would prepare a nucleus of young professionals who could eventually act as consultants. Another training arrangement is the placement of interns with established consulting organizations. The number of interns that can be placed with foreign consulting firms varies with the type of consulting activity. The confidential character of the consultant-client relationship in management advisory situations normally makes the presence of visiting intern observers undesirable. However, there are instances where a management intern could act as a counterpart when foreign experts are in his country. There are better opportunities for interns in the engineering and physical sciences, where special opportunities for training exist on account of "sister" relationships established between research institutes in developed and developing countries.¹²

In addition, various training courses have been organized by many consulting firms, productivity centres, research institutes and administrative staff colleges. These organizations offer basic as well as refresher courses, and may provide special training for more senior personnel. Some programmes are specially designed for consultants and advisory staff. Other training seminars, such as those on work study methods, which are intended primarily for staff members in industrial firms, are equally appropriate for consultants and contract advisers. The total number of such courses is far too great to be listed here, but a good many interesting examples are given in Dustan and Mekanowitzky's *Training Managers Abroad*.¹³

The Organization for Economic Co-operation and Development (OECD) has prepared several directories of training opportunities, including a *Catalogue of Social and Economic Development Training Institutes*

¹² Ralph A. Krause, "Role of a research institute", in *Science, Technology, and Development, Vol. IX, Scientific and Technological Policy, Planning, and Organization*. U. S. Government Printing Office, Washington, D. C., 1963, p. 32.

¹³ J. Dustan and B. Mekanowitzky, *Training Managers Abroad*. Council for International Progress in Management, New York, 1960.

Annex 1

CASE STUDIES

Case study No. 1: **SAMPLE CALL FOR TENDER FOR ADVISORY SERVICES FOR THE DISTRIBUTION OF LIQUID PETROLEUM GAS**

In the present instance, a number of major consulting firms were invited to prepare bids. Four consulting firms presented their offers, and the relevant experience, staffing, scope of work and the fee for consultation services of each of them were taken into consideration in awarding the contract.

OUTLINE SPECIFICATION FOR ADVISORY SERVICES FOR THE DISTRIBUTION OF LPG

The Council of Ministers of Country Y has requested the relevant Government organization (RGO) to investigate the implementation of their concession for the marketing and distribution of liquefied petroleum gas (LPG).

The LPG is purchased from the gas company by various companies who distribute it throughout the country.

The gas company was formed out of the merger of company A and company B. The merged company has two bulk depot installations in town D, two in town E and one in town F. Company A started operations in the 1950's and sales rose rapidly in the first years and there is now a steady rate of increase in annual sales. Company B existed only about two years.

Retail prices of LPG in certain parts of the country are at present unnecessarily high and the general price structure is inconsistent. An official Government report indicates the existence of unsafe working practices constituting a hazard to life and property. There are unofficial reports of possible inefficiencies in operation and management.

SUMMARY

After consultation with the Ministry of Commerce and Industry, the RGO decided to draw up a plan for the investigation of the LPG industry by outside consultants or advisers under two headings :

- (a) Specific advice and assistance to an already existing gas company;
- (b) Formulation of Government and RGO policy towards the LPG industry as a whole.

In addition, the RGO consults with the Chairman of the gas company, who expresses his willingness to seek outside advice through the RGO. As a gesture and an incentive for effective co-operation, the gas company agrees to pay 50 per cent of the fees and expenses for that part of the work which has to do with its operations.

This outline specification for advisory services describes the assignment for carrying out the above work and consultants will be invited to tender on this basis. The sequence and method of approach is left to the discretion of the consultant, who should state briefly in his offer how he intends to undertake the work, the approximate time required for its completion and the number and qualifications of the people he will employ.

As a first step, it may be judicious to make a detailed study of the gas company and then survey the industry as a whole. The ultimate aim of this investigation is to ensure that the cheapest and safest LPG services are made available to the consumer.

Proposed study relating to the gas company (Part 1)

It is proposed that the following points should be studied by the consultant :

(a) The company's financial position, including an evaluation of its assets and liabilities, compilation of inventory, plant and equipment, with a view to determining its net worth.

(b) A market survey of existing and potential sales of LPG.

(c) The duplication and overlap of the merged companies, with a view to streamlining the single organization.

(d) The handling and operation of plant and equipment, with recommendations for eliminating inefficiencies and malpractices.

(e) The profitability assessment, unit cost study and break-even point assessment, with recommendations for maintenance and depreciation rates, cost and profit control.

(f) The management and organizational structure, accounting system, procedures, job functions and staff/labour requirements, pay scale and personnel policy.

(g) Recommendations for the implementation of the consultant's report.

(h) Recommendations for the selection and training of management employees.

Formulation of the RGO's policy (Part 2)

The scope of work under the above heading comprises :

(a) The establishment of the future potential of the LPG industry in the country in relation to competitive industries and other petroleum products ; estimates of future population and consumer demand.

(b) The establishment of the maximum selling or price structure throughout the country.

(c) The adoption of LPG safety regulations and the establishment of minimum engineering standards, with recommendations for mandatory Government control of such regulations and standards.

(d) The examination of the RGO's concessionary rights with a view to possible participation in the gas company and of the method of issuing licenses.

(e) A brief survey of other gas companies, with recommendations for improving safety and operating conditions.

Contract conditions

(a) The consultant will be responsible and report to the Governor of the RGO or his deputy.

(b) All necessary expenses relating to clerical assistance, cables and postage will be borne by the RGO.

(c) All travel outside the capital of the country – seat of the RGO – and all living expenses incurred will be borne by the RGO.

(d) Consultants must submit their offers to the Governor of the RGO in a sealed envelope by the specified date.

(e) The offers may be submitted at a *per diem* rate, or cost plus or lump sum bid, with an appropriate estimate of duration.

(f) Consultants submitting bids are free to carry out preliminary on-the-spot surveys at their own expense in order to give more realistic quotations. If necessary, the RGO will arrange for visits and provide assistance and further information on request.

Case study No. 2: **THE SELECTION OF A CONSULTANT FOR THE ESTABLISHMENT OF A CEMENT PLANT IN A DEVELOPING COUNTRY**

A newly discovered deposit of limestone and marl was considered to be satisfactory for cement production and a company was formed for the production, sale and export of cement. A call for tender was thereupon prepared and issued to local and foreign consulting firms for a complete study of the extent of the deposit, its composition and adequacy for cement production, as well as of the size of internal and external markets; a preliminary design location study; a domestic and export market study and a feasibility study. In addition, the consultant was to prepare specifications and the books of tender for equipment, auxiliary and civil engineering work, and to co-ordinate and supervise the erection of the plant.

It was stipulated that the offer was to be presented in two sealed envelopes, A and B, which would be opened consecutively. Envelope A, containing documents and information on the consulting firm, would serve as a basis for judging the qualifications of each firm. Envelope B would only be opened when consultants had been found acceptable after the contents of envelope A had been examined. In the case of consultants considered unqualified, envelope B would be returned

unopened. Foreign firms were to have a local representative or a temporary partnership with a local consulting firm or individual consultants for the duration of the project. The last day for receiving offers as well as the date of the opening of bids was stated in the call for tender.

Envelope A was to contain the following details or documents :

- (a) The name of the organization, the year in which it was established, the country in which it was incorporated, the number of its employees and its capital ;
- (b) The name and qualifications of the staff members who would work on the project ;
- (c) The number, size and summary of project studies similar to the one under consideration ;
- (d) Certified letters of satisfaction from previous clients ;
- (e) Bank guarantee to the effect that the consultant had no direct or indirect relation with a supplier or manufacturer ;
- (f) Bank guarantee (\$ U.S. 2,500) to the effect that, if selected, the consultant would not withdraw ;
- (g) A signed document stipulating that the price quoted would be binding ;
- (h) The detailed scope of work by phases ;
- (i) The time (calendar months) necessary for the preparation of each phase ;
- (j) Any pamphlets, literature or other documents considered to be necessary by the consultant.

Envelope B was to contain the cost quoted for each phase, which might include or exclude travel, living and other out-of-pocket expenses. If out-of-pocket expenses were excluded, the fact was to be indicated clearly.

All consulting firms were found qualified on the basis of the information supplied in envelope A. Envelope B was then opened and the offers evaluated. Two firms were selected and negotiations were begun on the basis of the information supplied in envelopes A and B.

Both were local, well-established consulting firms who had teamed with highly qualified, reputable consulting firms. In this particular instance, the client carried out negotiations with both local consulting firms at the same time. Each of the two firms was asked to estimate fees for plant capacities of 400 and 600 tons per day, and one of them was awarded the contract after lengthy negotiations.

Case study No. 3: **A FEASIBILITY STUDY FOR A BAGASSE PAPER MILL**

The manufacture of paper from sugar cane bagasse is not new. Paper plants using bagasse have been operated successfully in several developing countries, including the Republic of China, Mexico and Cuba. But, generally speaking, it is technically difficult to manufacture high-quality paper from bagasse and considerable amounts of this raw material consequently go to waste or are used as fuel.

A client in a developing country retained a consultant to study the feasibility of setting up a paper mill which would utilize bagasse. The consultant made a field survey. He estimated and evaluated the raw materials, undertook technical and economic product studies, investigated possible plant sites and related facilities, evaluated investment requirements, production costs and estimated profits.

The demand for writing and printing paper is increasing rapidly in developing countries. In the country under consideration, domestic consumption has reached 41,000 tons per annum, 50 per cent of which is imported. Though sugar cane is cultivated in the country, the bagasse is not utilized. At present, the client has four sugar mills and desires to expand manufacturing capacity by installing three additional mills.

The existing sugar mills produce some 83,000 tons of bagasse *per annum*. Two thirds of this quantity is consumed as fuel in the mills and one third, or 28,000 tons (bone dry) is wasted or sold as fuel. Moreover, the bagasse obtained from the proposed three sugar mills would be equivalent to about 11,667 tons (bone dry). The surplus bagasse available for industrial purposes will therefore be 39,667 tons.

The amount of paper that can be produced from bagasse is equivalent to 38 per cent of the weight of the bagasse. For the tonnage of bagasse estimated above, this would be equivalent to: 39,667 tons \times 38 per cent = 15,073 tons of paper per year, which is about 45 tons of paper per day.

The above percentage should be adjusted to take into account the moisture content of paper:

$$45 \text{ tons} \times 1.06 = 50 \text{ tons per day}$$

On the basis of the above estimation, it was considered possible to construct a plant with a daily production capacity of 50 tons to manufacture high-grade writing and printing paper by the bleached kraft process.

The plant was designed to meet these requirements and the cost was calculated. It was estimated that approximately \$ U.S. 15.5 million would be required for plant construction. This amount includes not only manufacturing equipment for processing pulp and paper, but power generation facilities, the recovery furnace, equipment for electrolysis and facilities for employees as well. The investment requirements (in \$ U.S. 1,000) for the paper plant, including power, electrolysis and recovery are shown below.

	<i>Paper plant</i>	<i>Power plant</i>	<i>Electrolytic plant</i>	<i>Recovery plant</i>	<i>Total</i>
Factory building	2,264	207	124	103	2,698
Machinery and equipment	5,534	1,400	340	1,110	8,384
Total ...	7,798	1,607	464	1,213	11,082

Engineering and construction

The estimated cost of the whole project, from the start of construction to the initial operation, is given below:

	(\$ U.S. 1,000)
Land and development, including railway siding	854
Factory building and civil engineering works	2,698
Machinery and equipment	
Cost of machinery and equipment	8,384
Insurance and inland transport	126
Ocean freight	420
Customs duty	610
Erection and installation	661
Housing	379
Know-how	504
Contingencies	205
Interest on foreign loan	601
Total . . .	15,442

Production cost

The total manufacturing and selling cost for a plant with an annual capacity (330 days per year) of 16,500 tons of fine quality paper is as follows:

	(\$ U.S. 1,000)
Direct manufacturing costs	1,681
Baling	138
Power cost (indirect)	22
Labour cost (indirect)	280
Maintenance	42
Insurance	12
Depreciation	1,100
Interest	601
Total	3,876
Sales tax (12%) . . .	465
GRAND TOTAL	4,341

Profitability

Estimated profit from a mill which produces 50 tons of paper per day is the following:

	(\$ U.S./ton)
Net selling cost ex-factory	261
Average market price on high-grade writing paper	420
Profit per ton = 420 - 272	159
Annual profit \$ U.S. 159 × 16,500 tons = \$ U.S. 2,442,000	

The annual rate of profit relative to invested capital is:

$$\frac{\text{Profit: } \$ \text{ U.S. } 2,623,500}{\text{Capital: } \$ \text{ U.S. } 15,442,000} = 16.9\%$$

Implementation

On the basis of the consultant's report, the client received permission from his Government to set up the proposed paper mill and the project is now under construction.

Case study No. 4: **THE IMPROVEMENT OF SOLAR SALT PRODUCTION AND REFINING**

STATEMENT OF THE PROBLEM

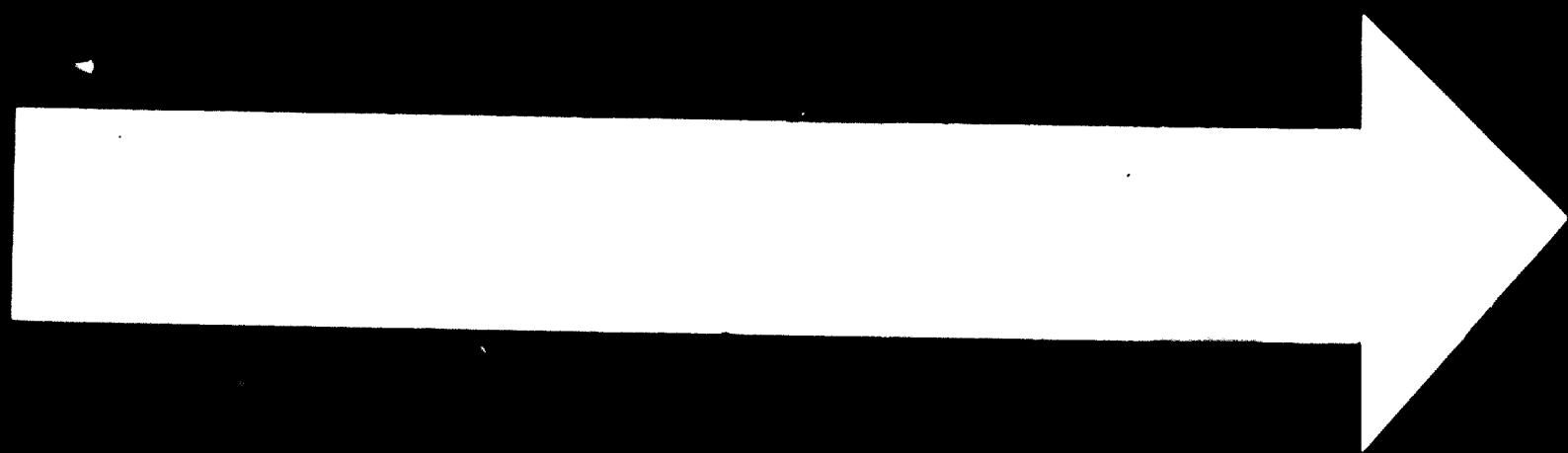
In 1955, a developing country in the Middle East had a yearly solar salt consumption of some 20,000 tons. Of this amount, about 15,000 tons were imported. The imported salt was of a better quality than the local salt. The latter was produced by simple methods and all the calcium and magnesium chemicals were left in the mass of sodium chloride.

Industrial consumers and importers pressed the authorities to grant import licenses for larger quantities of salt. This was opposed by the local salt producers. The majority of them were small producers—with annual productions of 400 to 500 tons—who realized that a liberal import policy would mean the end of their business. Yet they were unable to improve the quality of their product.

Salt was being produced on the shore, in areas owned by the producer or rented from the Government for an annual fee of \$ U.S. 1.60 per square metre. The areas where the salt was produced did not lend themselves to salt production because they were rocky and situated on different levels. Beds of concrete were laid over the rocks, and shallow individual ponds or irregular or rectangular shapes were constructed, each having an average area of about 15 to 20 square metres. Such a layout generally did not allow for the natural flow of sea water and brine or the drainage of mother liquor from the crystallized salt. This further necessitated the pumping of sea water into open concrete reservoirs by means of airwheels and piston pumps.

The salt was raked from the pan bottoms, piled on the sides for preliminary draining, then placed in 120-kg burlap bags which were allowed to stand on the side of the ponds for a day or two before transport to refineries or delivery for industrial use. In the refineries, the salt was subjected to grinding and heat drying and chemicals were added to it to improve its flowing properties. Nothing was done to remove the insoluble calcium sulphate or the calcium and magnesium chlorides, which caused the bitter taste, the high hygroscopicity, the deliquescent nature and the caking property of the salt.

The price paid for the locally produced salt varied from 1 to 1.6 U.S. cents per kg, ex-salt pond, for arbitrarily established grades, whereas the price of the imported coarse crystal salt on the local market was about 3 to 4 U.S. cents per kg and the price of the high-grade table salt was about 20 to 25 U.S. cents per kg. Import was on a quota basis.



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and Programmes, 1965; a companion volume entitled *Catalogue of Research Institutes and Programmes Relating to Social and Economic Development*; and a European directory, *Inventory of Training Possibilities in Europe, 1965*. The Colombo Plan Bureau has published a lengthy *Handbook of Training Facilities at the Technical Level in South and South-East Asia*. Several other directories list research institutes and development agencies which undertake training activities.¹⁴

In short, many consultants feel that the best training for the consulting profession is on-the-job training in a consulting firm or organization. Most people also agree that specific industry experience in a wide variety of industrial situations is equally valuable for engineering and technical consultants. The better consulting organizations have established well-organized training and development programmes which comprise the following: on-the-job training, with junior staff assigned to senior firm members on actual consulting projects; supplementary in-house training for junior staff members; and refresher or advanced specialized training for senior staff members. Any government or agency which contemplates establishing a consulting or advisory extension service must initiate a programme to ensure the continuous training of senior advisory personnel. Such investments in education will not only enable the staff to undertake some consulting services that must now be imported, but will also have wider advantages which will be felt if and when certain staff members move into responsible positions in public or private industrial firms.

REMUNERATION

Though most of those who choose consulting as a career are attracted by the psychological rewards inherent in the challenging nature of the profession, a minimum requirement for the development of a worthwhile consulting profession is the prospect of receiving salaries and benefits that can compete with those which scientists, technologists, engineers, management experts, and so forth, receive elsewhere. This includes not only actual earnings—fees and salary—but also fringe and social benefits, such as pension rights and the assurance of a steady income. Consulting is often attractive to people who are willing to take risks and to exchange some element of security for the prospect of higher earnings. But, on balance, the material rewards of the profession must look attractive enough to draw the talents that are needed.

When a government or private organization staffs or subsidizes a consulting service, the remuneration which the desired personnel could obtain in other employments should be taken into consideration. A govern-

¹⁴ See: *International Guide to Directories on Resources in International Development*. Society for International Development, Washington, D. C., pp. 10—16.

ment might establish the consulting service as an autonomous or semi-autonomous body and thus be free to pay salaries that are higher than those paid according to the prevailing civil service scale. Furthermore, in many cases government and semi-governmental corporations are the major suppliers, subsidizers and purchasers of advisory services and thus exercise a considerable influence on the general level of remuneration.

THE PROFESSIONAL ENVIRONMENT

Professional societies, journals, meetings and seminars provide a fruitful means for the exchange of ideas and information. All these are necessary if the practitioner is to keep abreast of change and increase his professional abilities. They also provide the satisfaction and inspiration that come from inter-professional discussion. The long-range benefit to be derived from such an environment is the development of a more competent and better informed consulting profession.

A more doubtful way of improving professional standards and status is professional licensing. This method may sometimes be used to ensure minimum standards of competence. But licensing can best perform such a function when the attribute to be measured is knowledge rather than personality, motivation, judgement, or even skill in application. The practice of licensing is also advocated because it confers a certain amount of prestige and status, though this is less desirable. Unfortunately, licensing often guarantees a semi-monopoly to existing practitioners in a country and restricts the access to the profession. Since the problem is to increase, rather than diminish, the supply of engineers, management advisers, technologists and so forth, such restrictive licensing should be avoided.

ASSISTANCE IN THE ESTABLISHMENT OF LOCAL CONSULTING ACTIVITIES

When efforts are being made to establish consulting services in the developing countries, various types of technical assistance may be considered. Information on techniques and organization may be privately exchanged by local and foreign consulting companies. The extent of co-operation will vary, of course, with each individual case. Again, certain types of "sister" arrangements often exist between research institutes in the developed and the developing countries. Sometimes, too, a research institute in an industrialized country helps establish a local research institute and supervises its operation in the beginning. Co-operative schemes also might be developed between affiliated international consulting organizations.

There are many types of bilateral and multilateral assistance programmes which may serve to strengthen the consulting profession and establish consulting organizations. Bilateral assistance programmes provide for graduate fellowships, internships and specialized study arrangements to train individuals either in consulting or advisory extension services. A number of management and productivity centres which supply advisory services to industry in developing countries have already been established on the basis of bilateral and multilateral assistance programmes.

An important means of providing multilateral assistance is the establishment and improvement of advisory services attached to industrial development banks and corporations, industrial research institutes, small-scale industry development centres, etc. which already enjoy the confidence of industrial managers. Multilateral aid and United Nations technical assistance programmes can also provide experts to train local professionals and assist them in the organization of consulting activities.

Integrated consulting services

ONE OF THE MOST important duties of consultants is the investigation, development and establishment of industrial facilities. In the present chapter, the services performed by consultants are reviewed from the time an industrial project is initiated until the time the industrial plant is commissioned. This requires a variety of consulting activities, some of which are discussed in greater detail in subsequent chapters.

The development of an industrial project may be due to various causes—the discovery of natural resources in mining or agriculture, the desire to exploit existing resources, the availability of new markets created by increased domestic demand, a systematic export promotion effort or an import substitution programme. It may also be undertaken within the wider purview of an industrial planning programme. The decision to ascertain the economic feasibility of a specific industrial project should be based on preliminary investigations indicating whether the venture warrants detailed study.

OUTLINING OF SUCCESSIVE STEPS

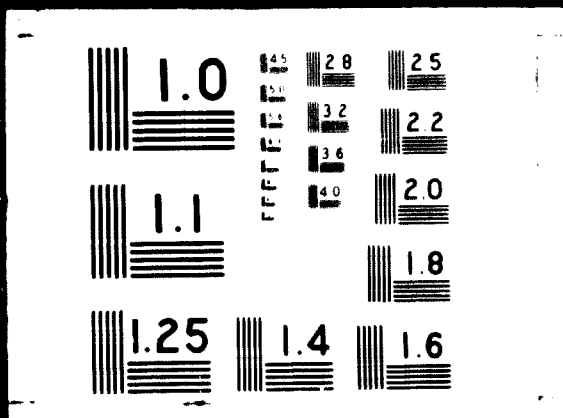
For purposes of illustration the successive phases of an industrial project are outlined in detail below, but in practice one or more steps could be combined or simplified. It is assumed that the industrial process used is based on available and well-established technology requiring minor adjustments.

(a) Feasibility study. The review of project feasibility entails the investigation of raw materials and the market, plant location, labour requirements, production costs, investment requirements, capital structure, financing and profitability outlook, as well as all other factors related to the viability of a venture. The findings of this phase are of decisive importance before proceeding to the next.

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The only solution to the problem was the improvement of production methods and the quality of the local salt. Domestic and industrial needs could then be more adequately met and the domestic product would command a higher price on the local market. A consultant was needed to survey production facilities, review the situation and advise on the action necessary to improve production methods both quantitatively and qualitatively.

SELECTION OF A CONSULTANT AND CONTRACT

The number of consultants specialized in solar salt production is small. People with considerable experience are either employed by the salt companies or are otherwise not available. This made it difficult to find potential consultants and the assistance of the commercial attaché of the embassies of industrialized countries was therefore sought.

Two of the world's leading salt producers were contacted directly, the problem was explained to them and their assistance was requested. After some correspondence, however, they refused to assist.

A consultant in salt production from another country, with an extensive knowledge of various crude solar salt-refining methods, was then contacted, but he had close ties with an equipment supplier for whom he acted as a consultant. The authorities finally turned to a leading consultant who had his own small consulting firm specializing in solar salt production and an excellent knowledge of production conditions in various parts of the world. The problem was presented to him and his co-operation requested.

A contract defining the scope of the work and the general administrative and financial conditions was thereupon prepared and dispatched to the consultant for his signature. Owing to the comparatively limited scope of the assignment, many of the general conditions which are usually included in contracts with consultants were not mentioned. The consultant was to spend one month in the country to survey the situation and then prepare and submit a report on his findings and recommendations within three months after his departure.

The fees¹⁸ of the consultant were:

Air transportation, round trip, first class

Per diem living allowance of \$ U.S. 12.00 for a period of 30 days

Per diem fee of \$ U.S. 100.00 per calendar day for 30 days

Report writing: \$ U.S. 100.00 per day plus 100 per cent overhead not to exceed 15 days, i.e., a maximum of $200 \times 15 = \$ \text{U.S. } 3,000$

Inland transportation, postage, telephone, telegram and incidentals to be provided by the client.

ACTIVITIES AND FINDINGS OF THE CONSULTANT

After the contract had been signed, the consultant asked that the following items or information should be supplied :

¹⁸ This project was executed in 1955. The fees are thus out of scale with those of today.

2. Local representative must be an engineer having obtained a licence to practice from the Ministry of Public Works on the basis of which he becomes a Member of the Order of Engineers.
3. Such licence is granted to foreign engineers on reciprocity basis.
4. Contracts are either negotiated or bid.
5. Negotiated contracts are generally preceded by pre-qualifications.

Kuwait

1. Engineering consultants establishing private practice are required to obtain a licence from the Municipality of Kuwait.
2. Firms employed directly by the Government for specific projects need no licence.
3. Consultants for Government projects are specifically exempted from Kuwait's agency or participation requirements.
4. Consultants directly or indirectly connected with material suppliers, manufacturers, contractors, commercial institutions, local agents, sponsors or correspondents are disqualified from bidding on Government projects.
5. Contracts are generally awarded by negotiations but also by bids.

Saudi Arabia

1. No requirement for licensing as such ; registry of consulting engineering firm constitutes licensing.
2. Local representation not required but desirable.
3. Non-Saudis could not act as exclusive agents for consulting services.
4. Consulting firms locating in the country are subject to combining with a Saudi partner (51%), the Saudi share of wages being 45%.
5. Above not applicable for one-job contract.
6. Competitive bidding is the rule though negotiations are sometimes used.

Turkey

1. Foreign engineers are required to register with appropriate chamber in the professional field. Such registration has a temporary character.
2. Foreign engineers cannot establish a business in Turkey.
3. Only employment with local firms holding contracts for specific Government projects or as individuals under contract with Government for a specific project.
4. Contracts may be bid or negotiated.
5. Ministries and municipalities can enter into contract only with the lowest bidder.
6. Negotiated contracts may take place with other Government agencies or private projects.

United Arab Republic

1. Work permit from Ministry of Social Affairs and Labour required for foreign consulting engineering firms.
2. Local representative of U.A.R. nationality is compulsory.
3. Local representative must be registered with the Ministry of Economy.

SAMPLE EXTRACTS FROM THE *Engineers' Overseas Handbook*²⁰

The *Handbook* lists important requirements and conditions currently affecting the ability of U.S. consulting engineers to work in 105 countries.

The replies to the following ten questions illustrate the types of regulations which control the activities of foreign consultants in 105 industrialized and developing countries.

1. Are practising engineers required by law to have a licence?
If so, what are the legal requirements?
How many engineers are registered?
2. Can foreign engineers (specifically U.S.) practise within the country without a licence issued by the country?
If not, what are the legal requirements for a U.S. engineer to obtain a licence?
3. Are U.S. consulting engineers required to have a local representative to practise in the country?
If so, must the local representative be a citizen of that country?
Can he be a resident U.S. citizen?
What are the registration requirements, if any, for establishing a local representative?
4. To what extent must local participation be involved in any contract with a U.S. consulting engineer?
5. Are contracts made with consulting engineers negotiated or does price bidding take place?
If the latter, is it legally possible to adopt negotiated contracts preceded by pre-qualifications?
6. Is there any discrimination (lack of equal treatment) practised against U.S. consulting engineers?
7. Are there any restrictions concerning the convertibility of currency or repatriation of fees?
8. Is it the practice to request consortium-type bids in which the engineering services are included with construction, materials, equipments and sometimes pre-bid financing plans?
9. Are U.S. consultants required to pay local corporate or other taxes?
What is the rate?
Are local engineers required to pay the same rate?
10. What Government agencies (with their general responsibilities) employ consulting engineers for public works or other types of engineering?

SAMPLE REPLIES FROM FOUR OF THE 105 COUNTRIES

Argentina

1. Engineers are required to have a licence. They must be registered with the engineering faculty of an acceptable university and with the municipal authorities in cities in which they wish to practise. The number of registered engineers is not known.

²⁰ Business and Defense Services Administration, U.S. Department of Commerce, *Engineers' Overseas Handbook*, Washington, D.C., 1965, pp. 7, 8, 59, 60, 73, 74, 135, 136.

2. Foreign engineers cannot practise without a licence. Foreign diplomas must be revalidated, which involves completing successfully a series of examinations given in Spanish. These examinations vary somewhat in courses, depending upon the local faculty and the university at which the diploma was obtained.
3. For practical purposes it is necessary for a U.S. consulting engineer to have a local representative. A properly registered local representative may sign professional work and thus obviate the necessity for locally revalidated diplomas; he can contribute valuable information on need for local modification of standard practises; and can search out projects in advance of public notice.

Local representatives may or may not be Argentine citizens, so long as they have locally valid diplomas. A regular commercial representative may be employed as a business agent, in which case the engineer would have to be locally licensed. The local representative can be a resident citizen of another country. The designated agent will have to register with municipal authorities in accordance with the Commercial Code.

4. Minimum local participation requires at least one locally authorized professional. Local employee participation is not otherwise required, but in most cases is desirable.
5. Contracts with private concerns are usually negotiated; public contracts are usually made as a result of competitive bidding. Considerable legitimate negotiation is carried on, even with competitive bidding.
6. Not available.
7. There are no legal restrictions, but applications for exchange for remittances submitted to the Central Bank have in the past experienced some delays.
8. It is the practice to request consortium-type bids, but there is some local feeling about the separation of engineering services from actual construction in order to protect the client's interests.
9. Consultants are liable for taxes on salary received in Argentina and any part credited to their accounts abroad. Individuals are taxed based on income on a scale starting at 8 per cent and reaching a maximum of 53 per cent. At present an emergency tax of 15 per cent over the income tax is levied. Income of foreign corporations is taxed at a uniform 44.1 per cent. Payments for royalties are subject to a withholding tax of 39.7 per cent, 10 per cent lower than the uniform tax for corporations, provided they incur expenses for research and development. Fees for advisory services rendered from abroad are also subject to a withholding tax of 39.7 per cent.

Those practising professions, either individuals or firms, and in general all activities generating profits, are subject to a provincial tax on their total gross income. This tax is also levied by the city of Buenos Aires. The rate varies depending on the jurisdiction, but in general it can be said that it amounts to approximately 1 per cent on gross income. Consulting engineering firms should contact Argentine tax authorities or public tax specialists prior to contracting for major projects.

10. Secretariat of Industry and Mining.
 Secretariat of Agriculture.
 Ministry of Economy.
 Ministry of Public Works.
 Government Fuel and Energy Works.
 State Petroleum Entity.
 State Coal Entity.
 Servicios Electricos del Gran Buenos Aires.
 Gas del Estado.

The language of Argentina is Spanish.

The metric system of weights and measures is used.

The peso is the unit of currency.

Ethiopia

1. Engineers are required to have a municipal licence. Licences may be obtained from any municipality upon payment of a fee. Assessment of the municipal fee is based on total turnover. (Engineers on duty-free contract, such as AID projects, are not required to pay the licensing fee.) There are seven registered engineers in Ethiopia at present.
2. Foreign engineers may not practise in Ethiopia without a licence issued by the appropriate authorities, and a resident permit and identity card obtainable from the Ministry of Foreign Affairs through missions abroad, or from the Ministry of the Interior, Department of Immigration, upon arrival.
 When applying for resident permits to practise engineering, applicants are required to state their qualifications in documents to be attached to their applications.
3. Consulting engineers practising in Ethiopia are not required to have local representatives.
4. Local participation in a contract is not required. Local employee participation is not required.
5. For Government awards, which comprise virtually all substantial contracts, price bidding takes place. It is possible to adopt negotiated contracts preceded by pre-qualification.
6. There is no discrimination.
7. All payments abroad require an exchange control permit from the State Bank. Consulting engineers are allowed to transfer their annual net profits. Repatriation of capital is limited to \$ U.S. 28,000 per year.
8. It has been the practice of Ministries requesting bids for Government projects to request consortium-type bids in which engineering services are included with construction, materials and equipment costs.
9. U.S. consultants are required to pay local corporate and other taxes.
 Corporate taxes levied on foreign consultants amount to 16 per cent of the gross income. Local engineers are required to pay the same rate.
10. The majority of contracts are let by :
 Ministry of Public Works ;
 Ministry of Communications ;

Ministry of Defence ;
Ministry of Interior ;
Imperial Highway Authority ;
Port Authorities of Assab and Massawa ;
Awash Valley Development Authority ;
All Ministries and autonomous agencies presumably might employ consulting engineers.

English and French are the languages most generally used commercially in Ethiopia, except in the province of Eritrea, where English and Italian are favoured.

The metric system of weights and measures is used.

The unit of currency is the Ethiopian dollar.

Great Britain

1. Engineers are not required by law to have a licence. The number of engineers practising in Great Britain is not known.
2. No licence is required for foreign engineers to practise in the country, but aliens must have a work permit to be employed in any capacity.
3. A U.S. consulting engineer need not have a local representative. However, the control of the employment of aliens is through the Ministry of Labour and National Service, which issues labour permits. Work permits are usually available for key technical people.
4. No local participation is required. Work permits are not normally granted for unskilled labour when the local supply is adequate.
5. Great Britain employs both methods of making contracts, price bidding and negotiation, but there is no legal obligation to let contracts for engineering services by advertised bidding.
6. There is no discrimination. Normally, contracts for engineering services are let to British nationals.
7. There are no restrictions on convertibility of currency or repatriation of fees. However, before issuing the requisite exchange permit, the Bank of England authorities must be satisfied that British income taxes have been properly paid.
8. Consortium-type bids are occasionally requested in Great Britain.
9. U.S. consulting engineers are subject to local taxes. The corporation tax is 40 per cent. The personal income tax is based on a maximum rate of 41 $\frac{1}{2}$ per cent of taxable income, which is considerably modified by reduced rates of tax and by deductions from gross income. There is also a surtax. Emoluments received from the United States are not subject to British income tax, provided the American engineer's stay in Britain does not exceed 183 days. Applicability of specific tax provisions should be checked in advance.
10. A British consulting engineering firm which is successful in obtaining a particular Government contract may subcontract with U.S. or other foreign consulting engineers for specific services. There is no restriction against the use of foreign consulting engineers for Government projects.

The official and commercial language is English.
 The British system of weights and measures is used.
 The unit of currency is the pound (£).

Malaysia

1. All engineers have to be registered under the Architect Ordinance and also with each local authority to which they may wish to submit plans. There were 50 consulting engineers registered as of August 1963.
2. Foreign engineers must be registered. The requirements are the same as for local engineers.
3. It is the policy of the Malaysian Government that foreign consulting engineers operate in conjunction with local representatives. The local representative must be a citizen of the country and must be registered.
4. Fifty-one per cent local staff is required.
5. Contracts are normally bid. Usually, a minimum of six bids is required. Contracts are not negotiated, except under exceptional circumstances.
6. There is no discrimination.
7. There are no restrictions on the convertibility of capital within the sterling area, of which Malaysia is a member. For firms with external accounts, repatriation of fees is unrestricted up to £50,000. Companies which are established permanently in Malaysia are permitted repatriation of agreed profits only.
8. It is not the practice to request consortium-type bids. These are requested only in extreme cases. Consulting engineers are never permitted to deal with contractors. Pre-bid financing plans are not allowed.
9. U.S. consultants must pay local taxes. Resident persons or companies are taxed according to a progressive rate schedule, from 6 to 45 per cent. Non-resident companies are taxed at a flat rate of 40 per cent and individuals at 30 per cent. There is a tax exemption of two years for companies which have been granted pioneer status.
10. The Public Work Department—all Government building works. Drainage and Irrigation Department.

Although Malay is the national language, English is the commercial language and is widely used in Government, industry, and schools.

The Chinese language is also used in commerce.

The British system of weights and measures is used.

The unit of currency is the Malayan dollar.

A SELECT LIST OF PROFESSIONAL CONSULTING ASSOCIATIONS

INTERNATIONAL FEDERATIONS

1. Confédération internationale des Associations d'experts et de conseils (C. I. D. A. D. E. C.) (International Confederation of Associations of Experts and Consultants)

Corso Vittorio Emanuele, 30
 Milan, Italy

2. Conference of Representatives from the Engineering Societies of Western Europe and the United States of America (E. U. S. E. C.)
Secretariat : Prinz-Georg-Straße 77
Düsseldorf 10, Federal Rep. of Germany
3. Fédération européenne des Associations de conseils en organisation (F. E. A. C. O.) (European Federation of Management Consulting Associations)
81, Avenue de Villiers
Paris XVIIe, France

Affiliated associations :

Austria

Vereinigung Österreichischer Betriebs- und Organisationsberater
(V. Ö. B.)
Strauchgasse 3
Vienna I

Denmark

Den Danske Sammenslutning Af Konsulenter i Virksomhedsledelse
c/o T. Bak-Jensen
Buen, Vester Farimagsgade 1
Copenhagen V

Federal Republic of Germany

Bund Deutscher Unternehmensberater (B. D. U.)
Friedlebenstraße 4
Frankfurt/Main

Finland

Association of Finnish Management Consultants
c/o Rastor Limited
Satamakatu 4
Helsinki

France

Association française des conseillers de direction (AFCD)
57, Rue de Babylone
Paris VIIe

Italy

Associazione fra Società e Studi di Consulenza Organizzativa (ASSCO)
Via Santo Spirito 14
Milan

The Netherlands

Orde van Organisatie-Adviseurs (O. O. A.)
Driekoningenstraat 4
Amsterdam C

Norway

Norsk Forening Av Raadgivende Rasjonaliserings Iurmeer
Munkedamsveien 53 B
Oslo

Sweden

Svenska Organisations Konsulters Forening (S. O. K.)
Grevturegatan 30
Stockholm

Switzerland

Association suisse des conseils en organisation
Löwenstrasse 3
Zurich 1

United Kingdom

Management Consultants Association (M. C. A.)
23/24 Cromwell Place
London, S. W. 7

4. Fédération internationale des ingénieurs-conseils (F. I. D. I. C.)
(International Federation of Consulting Engineers)
Jan van Nassaustraat, 91
The Hague, Netherlands

*Affiliated associations:**Australia*

The Association of Consulting Engineers (Australia)
c/o Foxall, Geeves and Wilcox
161 Clarence Street
Sydney, NSW Tel.: 29-4821

Belgium

Chambre des ingénieurs-conseils de Belgique (C. I. C. B.)
Secrétariat général: 26, Avenue du Duc Jean
Bruxelles Tel.: 27-42-44

Canada

The Association of Consulting Engineers of Canada (Inc.)
176 St. George Street
Toronto

Denmark

Foreningen af Raadgivende Ingeniører (F. R. I.)
Dansk Ingeniør forening, Vester Farimagsgade 29
Copenhagen

Federal Republic of Germany

Verein Beratender Ingenieure e. V. (V. B. I.)
Berufsverband der freischaffenden unabhängigen Ingenieure
Krekelerweg 48, Essen-Steele Tel.: 50191

Finland

Suomen Neuvottelevien Insinooren Liitto (S. N. I. L.)
Uietalahdenkatu 8 A, Helsinki

France

Chambre des ingénieurs-conseils de France (C. I. C. F.)
30, Boulevard du Montparnasse
Paris XV^e Tel.: 783-26-21

The Netherlands

Orde van Nederlandse Raadgevende Ingenieurs (O. N. R. I.)
 Laan van Meerdervoort 343
 The Hague Tel. : 638179

Norway

Raadgivende Ingeniørers Forening (R. I. R.)
 Tidermandsgat 22
 Oslo Tel. : 44 79 87

South Africa

The South African Association of Consulting Engineers
 Kelvin House, Johannesburg Tel. : 33-5248

Sweden

Svenska Konsulterande Ingenjörers Forening (S. K. I. F.)
 Linnegatan 12-14
 Stockholm Tel. : 670205

Switzerland

Association suisse des ingénieurs-conseils (A. S. I. C.)
 Universitätsstraße 105
 Zurich 8006 Tel. : 26-01-16

United Kingdom

The Association of Consulting Engineers (Incorporated) (A. C. E.)
 Abbey House, Victoria Street
 London, S. W. 1 Tel. : ABBey 6557

United States of America

Consulting Engineers Council
 1155-15th Street N. W.
 Washington, D. C. 20005 Tel. : 296-1780

5. Union internationale des laboratoires indépendants
 (International Union of Independent Laboratories)
 Coolhaven 32
 Rotterdam, Netherlands

*Other national associations**Argentina*

Centro Argentino de Ingenieros
 Cerrito 1250, Buenos Aires

Australia

Association of Professional Engineers of Australia
 114 King Street
 Melbourne, Victoria

Belgium

Consortium d'organisation-conseils
 23, Rue Royale
 Brussels 1

Canada

Canadian Association of Management Consultants
630 Dorchester Boulevard West
Montreal 2, P. Q.

Canadian Testing Association
Suite 706
696 Yonge Street
Toronto 5, Ontario

Ceylon

Institute of Engineers of Ceylon
PWD Building
Chatham Street
Colombo 1

Denmark

Ingeniør-Sammenlutningens Raadgivende Ingeniører
9 Kristianiagade, Copenhagen

Federal Republic of Germany

Verband Unabhängig Beratender Ingenieurfirmen
Argelanderstrasse 59
Bonn

France

Chambre syndicale des bureaux d'études techniques de France
9, Rue du Mont-Thabor, Paris 1er

India

All India Management Association
Press Bhavan
SE, Rani Jhansi Road
New Delhi

Engineering Association of India
MacKennon MacKenzie Building
Ballard Street
Bombay 1

Institute of Consulting Engineers
9 Hastings Street
Calcutta 1

Management Consultants Association of India
c/o Modern Management Counsel
Shakqar Bavan
Kurla Industrial Estate
Bombay 77

Ireland

Engineers Association
22 Clyde Road
Dublin 4

- (a) Maps of the country showing the location of the production area;
- (b) Weather data (rain, winds, temperature, maximum, minimum and mean humidity, starting and end of rainy season, hours of sunshine, etc.);
- (c) Production data, production season;
- (d) Typical salt analysis results and salt samples;
- (e) Photographs of salt ponds, drying plants and other available information.

All this was sent to him before his arrival. The liaison with the consultant was established through the newly created local Industrial Research Institute which was able to supply the necessary data and information on technical questions (sampling, analysis, mapping, etc.) as well as on administrative matters (contracts, appointments and transport). Members of the Institute knew from previous studies that there were only three possible courses of action.

(a) The first possible solution was to leave the production phase unchanged and to improve the resulting product (salt) by means of physical refining (counter-current wash methods in saturated brine) followed by thorough drying and, possibly, crushing. This solution would require less investment capital. The salt thus produced, however, would be inferior in quality to imported crystallized table salt, though comparable to imported industrial salt.

(b) An alternative method was to purify the salt chemically and then to concentrate and recrystallize it in vacuum double or triple effect evaporators. The resulting salt would be pure, crystalline in structure, comparable to the best imported table salt. However, it would be much more expensive. Capital and fuel requirements would also be considerably higher.

(c) The third solution consisted in relocating the whole salt producing industry in an area where both the land configuration and soil composition would permit efficient concentration, crystallization and harvesting methods. This solution, though technologically appealing, would have many social drawbacks. Moreover, since one of the major aims was to improve the condition of the five hundred salt producing families, any recommended solution would have to take that fact into consideration.

WORK PROGRAMME OF THE CONSULTANT

The duties of the consultant in the country were:

- (a) To make a systematic survey of the coast in order to assess how far any portion of it was suitable for salt production;
- (b) To take samples of sea water at particular spots where the coast appeared to be favourable for salt pond construction;
- (c) To visit typical salt ponds and make a detailed study of their production processes, with particular reference to densities, concentrations and yields;
- (d) To visit a few drying plants in order to observe their working schemes, the efficiency of their driers and the yields of their operation;
- (e) To collect samples of salt produced at the ponds. On the basis of arbitrary criteria of colour and appearance, these samples were classified by the producers as very good, good, fair and bad. They were sent to the laboratory for analysis and qualitative and quantitative determination of impurities.

Israel

Association of Engineers and Architects
200 Dizengoff
Tel Aviv

Israel Association of Management Consultants
P. O. Box 16116
Tel Aviv

Italy

Associazione Italiana Consulenti in Organizzazione
Via Vassalli Eandi 17
Turin

Japan

Engineering Consulting Firms Association, Japan
Gloria Building
Kasumigaseki 3 - chome
Chiyoda-ku, Tokyo

Japan Management Association
Kyoritsu Building
25, Shiba Park
Minato-ku, Tokyo

Japan Management Consultants Association
1-2, Chome, Ginza-Nishi
Chuo-ku, Tokyo

International Engineering Consultants Association
15, Akasaka Tameike
Minato-ku, Tokyo

Korea

Korean Business Consultant Association
13, 3-ka, Namsan-Doug,
Joong-ku, Seoul

New Zealand

The New Zealand Institute of Management
17 Grey Street
Wellington

Norway

Tekniske Konsulenter Forening
Tidemandsgt 22, Oslo

South Africa

Management Consultants Association of South Africa
c/o W. D. Scott & Company (pty) Limited
P. O. Box 9153
Johannesburg

Switzerland

Association of Swiss Consulting Engineering firms
Seefeldstrasse 9
CH-8008 Zürich

Turkey

Turkish Management Association
Erk Apt. 14/8
Cumhuriyet Caddesi
Elmadag, Istanbul

United Kingdom

Association of Consulting Scientists
Park House, Hawthorne Road
Bromley, Kent
British Overseas Engineering Services Bureau
737-240 Abbey House, Victoria Street
London, S. W. 1
Scottish Association of Management and Industrial Consultants
97 George Street
Edinburgh 2, Scotland

United States of America

American Council of Independent Laboratories, Inc.
TWA Building
1026-17th Street N. W.
Washington, D. C.
American Institute of Chemical Engineers
345 East 47th Street
New York, N.Y. 10017
American Institute of Consulting Engineers
United Engineering Center
345 East 47th Street
New York, N.Y.
American Society of Civil Engineers
345 East 47th Street
New York, N.Y.
Association of Consulting Management Engineers
347 Madison Avenue
New York, N.Y. 10017
Association of Management Consultants
947 Old York Road
Abington, Pennsylvania
Society of Professional Management Consultants
207 East 37th Street
New York, N.Y. 10016

Annex 3

SPECIMEN CONTRACTS AND FEE SCALES²¹

INTERNATIONAL MODEL FORM OF AGREEMENT BETWEEN
CLIENT AND CONSULTING ENGINEER

THIS AGREEMENT made in duplicate the day
of in the year Nineteen Hundred and
between
hereinafter called "the Client", of the one part
and

Consulting Engineer(s) hereinafter called "the Consulting Engineer", of the
other part.

WHEREAS the Client is desirous that engineering services be rendered for the
following project :

(description of the reference)

NOW THESE PRESENTS WITNESS and it is hereby agreed and declared by and
between the parties hereto as follows :

Art. 1. Appointment of Consulting Engineer(s)

The Client hereby appoints the Consulting Engineer(s) and the Con-
sulting Engineer(s) accept(s) the appointment on the conditions as
laid down in the annexed "International General Rules for Agreement
between Client and Consulting Engineer" (IGRA 1963) and on the
terms and conditions hereinafter set forth.

Art. 2. *(Here fill in the special conditions such as applicable law, method of remuneration,*
Art. 3. *etc. ; see the articles of the annexed Rules marked with*)*
etc.

In witness whereof the parties sign :

the Client :

the Consulting Engineer :

²¹ The following model forms of contract are included for purposes of illustration and have been selected merely as examples.

The fee scales presented here are meant to illustrate various methods of calculating and standardizing fees in individual countries. It should be pointed out that scales of fees vary from one country to another, and that in many countries no standard fee scales have been developed. Moreover, in cases where standard fee scales do exist, they apply only to consulting assignments within the country where the scale has been developed and are generally not applicable to assignments carried out in other countries.

INTERNATIONAL GENERAL RULES FOR AGREEMENT BETWEEN CLIENT AND CONSULTING ENGINEER (IGRA 1963)

1. General provisions

1. 1. These rules concern the professional relationship between an individual person, corporate body or public authority (hereinafter called "the Client"), who wishes to engage the services of a Consulting Engineer, Partnership of Consulting Engineers or legal entity of Consulting Engineers (hereinafter called "the Consulting Engineer"), to advise on engineering matters or to design and supervise the construction of engineering works and the Consulting Engineer so engaged.

1. 2. Words importing the singular only also include the plural and *vice versa* without in either case altering the meaning of the context.

1. 3. The headings shall not limit, alter or affect the meaning of these rules or the Agreement.

*1. 4. If the Agreement is written in more than one language it shall be stated in the Agreement which of these languages shall be the "Ruling Language".

*1. 5. In the Agreement it shall be stated under the legal provisions of which country the Agreement has been concluded.

1. 6. The Client shall safeguard the Consulting Engineer against the consequences of any incompatibility between the provisions of these rules and/or the Agreement and the legal provisions under which the Agreement is concluded.

1. 7. These rules shall be referred to as "IGRA 1963".

2. Rights and duties of the Client and the Consulting Engineer

2. 1. The Consulting Engineer shall in all professional matters act as a faithful adviser to the Client and, in so far as any of his duties are discretionary, act fairly as between the Client and the Contractor.

2. 2. The Consulting Engineer shall exercise all reasonable skill, care and diligence in the discharge of his duties under the Agreement.

2. 3. The Client shall furnish all pertinent data and information available to him and shall give such assistance as shall reasonably be required by the Consulting Engineer for the carrying out of his duties under the Agreement.

2. 4. The remuneration of the Consulting Engineer charged to the Client according to clause 6 shall constitute his only remuneration in connexion with the Agreement, which *inter alia* implies that he shall not accept any trade commission, discount, allowance or indirect payment or other consideration in connexion with the reference.

2. 5. The Consulting Engineer shall not have the benefit, whether directly or indirectly, of any royalty on, or of any gratuity or commission in respect of, any patented or protected article or process used on or for the purpose of the Agreement unless it is mutually agreed that he may.

2. 6. The Consulting Engineer, when in charge of supervision of Works under construction shall have authority to make minor alterations to design as may be necessary or expedient, but he shall obtain the prior approval of the Client to any more substantial modification of the design and costs of the said Works and to any instruction to a Contractor which constitutes a major variation, omission or addition to the Contract. In the event of any emergency, however,

which in the opinion of the Consulting Engineer requires immediate action in the Client's interests, the Consulting Engineer shall have authority to issue such orders as required on behalf of and at the expense of the Client.

2. 7. The Consulting Engineer shall not be the medium of payments made on behalf of the Client to Contractors and/or Suppliers, unless specifically so requested by the Client. He will however issue certificates for such payments.

2. 8. The Client shall give his decision on all sketches, drawings, reports, recommendations and tender documents laid before him by the Consulting Engineer in such reasonable time as not to delay the work of the Consulting Engineer.

2. 9. The Consulting Engineer may call in the assistance of other Consultants or Experts. He shall be entitled to charge the ensuing costs to the Client when prior approval in writing has been obtained.

2. 10. The copyright of all documents prepared by the Consulting Engineer in connexion with the Agreement rests with the Consulting Engineer. The Client shall not be entitled either directly or indirectly to make use of these documents for the carrying out of the work other than under the supervision of the Consulting Engineer and/or of any additional or similar work without prior approval of the Consulting Engineer and without additional remuneration.

2. 11. The Consulting Engineer shall have the right, subject to the Client's approval, which shall not be withheld unduly, to publish descriptive articles with or without illustrations, relevant to the reference either on his own account or in conjunction with other parties concerned.

3. Preparation, conclusion, alteration and termination of the Agreement

3. 1. The Agreement is considered to have come into force immediately upon the signature of the Form of Agreement or alternatively upon the signature of other documents clearly indicating the intention of both parties to collaborate on the basis of these Rules.

3. 2. Should circumstances arise which call for modifications of the Agreement these may be made by mutual consent given in writing. Proposals in this respect from one party shall be given due consideration by the other party.

3. 3. The Consulting Engineer shall not have the right to assign or transfer the benefit or obligation of the Agreement or any part thereof. However, the Consulting Engineer shall be entitled at any time to take into partnership another partner or partners (or directors) and he or they shall thence be deemed to be included in the expression "the Consulting Engineer".

3. 4. The Agreement shall not be dissolved by the death of the Client. His rights and obligations shall pass to his Successors.

3. 5. Should the Consulting Engineer, being an individual, die or be prevented by illness or any other circumstance beyond his control from performing the obligations implied by the Agreement or having it performed entirely, the Agreement comes to an end without prejudice to the accrued rights of either party against the other.

The Client shall in that case owe the Consulting Engineer or his Successors and Assigns against surrender of the documents necessary for the continuation of the work in so far as they are available, such part of the remuneration as corresponds to the state of the work of the Consulting Engineer under the Agreement, including any reimbursable costs and those costs (if any) ensuing for the Consulting Engineer or his Successors or Assigns from contracts already entered into in respect of the reference, in so far as they are not yet reimbursed by the Client.

3. 6. Should the Consulting Engineer be a partnership or legal entity the Agreement shall not be dissolved by the death or retirement of a member of the partnership or a director of the legal entity.

3. 7. Should the Consulting Engineer be unable to fulfil his obligations under the Agreement owing to circumstances beyond his control or owing to some unreasonable action of the Client towards him or because the Client does not meet his obligations under the Agreement, he is entitled to suspend his activities and/or to cancel the Agreement in which latter case the provisions referred to under 3. 5 apply, without prejudice to his right to claim damages from the Client if there are grounds to.

3. 8. In the event of the whole or any part of the Works being postponed or abandoned or if for any reason whatsoever the Client cancels the Agreement as a whole or a part of it the same amounts are due to the Consulting Engineer as referred to under 3. 5 increased by one quarter of the remuneration agreed upon for that part of the Works which, due to the aforesaid circumstances, will not be completed by the Consulting Engineer. If the remuneration is on a time-salary basis in accordance with 6. 1 under A the Consulting Engineer shall be entitled to payment during a reasonable time for those of his staff who have been working on the reference and who have to be transferred to other jobs in addition to the amounts due to him as referred to under 3. 5.

3. 9. If, within two years, the postponed Works or any part thereof shall again proceed, any relevant payments made under 3. 8 shall rank as payments on account towards the total fee actually payable, it being understood that the extra time spent by the Consulting Engineer in connexion with the resumption of the postponed Works and the actual costs of the additional work will be subject to an additional charge.

4. Liability of the Consulting Engineer

*4. 1. The Consulting Engineer is liable for the consequences of errors and omissions on his part or on the part of his employees in so far as specified in the Agreement and to the extent mentioned therein and with the limitations referred to hereunder.

4. 2. If according to the Agreement the Consulting Engineer has certain liabilities for errors and omissions the indemnification to be paid by the Consulting Engineer shall only be based on the seriousness in character thereof and shall be determined in relation to the Consulting Engineer's fee for the Works and shall never be in excess of that fee.

4. 3. The liability of the Consulting Engineer does not cover costs other than those for the reinstatement of the Works. All liability for consequential damages is excluded.
4. 4. The liability of the Consulting Engineer (if any) expires after two years from the date of completion of the relevant part of the Works.
4. 5. The Consulting Engineer has no liability whatsoever for any part of the Works not designed by him or under his responsibility or which have not been constructed under his supervision.
4. 6. The Consulting Engineer has no liability whatsoever for any part of the Works for which the liability rests with the Contractor or the Supplier.
4. 7. The Consulting Engineer has no liability whatsoever for any damage resulting from any act of Contractors or Suppliers which is not in accordance with the contract documents or the Consulting Engineer's instructions.
4. 8. The Consulting Engineer has no liability whatsoever for any violation of legal provisions or rights of third parties unless these provisions or rights have been specifically brought to the notice of the Consulting Engineer by the Client in writing.

5. Settlement of disputes

5. 1. Any dispute or difference arising out of the Agreement and/or the provisions of these Rules, including those considered as such by only one of the parties, shall be finally settled under the Rules of Conciliation and Arbitration of the International Chamber of Commerce in Paris by one or more arbitrators appointed in accordance with the said Rules.

6. Remuneration of the Consulting Engineer

*6. 1. The remuneration of the Consulting Engineer may be agreed upon according to one or more of the following systems :

- A. On a time-salary basis plus reimbursable costs as defined in 6. 9 ;
- B. As a percentage of the cost of the Works as defined in 6. 6 plus reimbursable costs as defined in 6. 9 ;
- C. As a lump sum plus reimbursable costs as defined in 6. 9.

6. 2. If the Agreement concerns construction of Works the remuneration payable to the Consulting Engineer covers, unless otherwise agreed upon :

- I. The preparation of such preliminary drawings, estimates and other engineering documents to enable the proposals for the construction of the Works to be submitted for approval by the Client, including as may be necessary :
 - (a) A survey or surveys of the site ;
 - (b) Investigation of available data or information relating to the Works ;

- (c) Advice to the Client as to the necessity for special investigations of conditions of subsoil, tide or weather, and arranging on the Client's behalf for boring tests, trial pits, test piling, models or other investigations agreed to be necessary ;
 - (d) Consultation with any architect appointed by the Client regarding any architectural matters related to the Works and with any other Consultant appointed by the Client in regard to specialized advice ;
 - (e) The making of such modifications in the outline drawings and estimates of the Works in connexion with the aforesaid consultations as may be approved by the Client.
- II. The preparation of the drawings, engineering documents and calculations required for the formal approval of any appropriate Government Department or Public Authority to the construction of the Works and the preparation of all drawings and other documents concerning Works to be tendered for, including as may be necessary in the particular case :
- (a) The making of designs, drawings, specifications and preparing schedules or bills of quantities ;
 - (b) The making or adapting of conditions of contract, forms of tender and invitations to tender and submitting the same for approval and decision of the Client.
- III. The supervision and the performance of other services in connexion with the carrying out of the Works including as may be necessary in the particular case :
- (a) Advising the Client as to tenders, tenderers, prices and estimates for the carrying out of the Works provided that no tender shall be accepted or order be placed by the Consulting Engineer except on behalf of the Client and with his authority in writing ;
 - (b) Advising as to the preparation of the contract to accepted tenders ;
 - (c) Preparing any further plans, designs and drawings necessary for the carrying out of the Works ;
 - (d) Examining and approving detailed drawings submitted by the Contractor ;
 - (e) Making arrangements on behalf of the Client for the inspection and testing during the manufacture of such materials and plant as are usually inspected and tested ;
 - (f) Issuing instructions to Contractor(s) and generally supervising the execution of the Works, including such site visits as the Consulting Engineer considers necessary ;
 - (g) Issuing all certificates for payments to the Contractor(s) and other certificates as required by the Client ;
 - (h) Supervising acceptance tests on site ;
 - (i) Assisting in settling disputes of differences that may arise between the Client and (a) Contractor(s) excepting litigation and arbitration ;
 - (j) On completion of the Works revise his drawings in accordance with alterations agreed during the execution.

*6. 3. If the remuneration is agreed on a time-salary basis according to 6. 1 under A, the Agreement shall state the *per diem* charge for the Consulting Engineer or the principals of the firm and the charge to be added thereto and to the pay-roll costs to cover general overhead expenses and profit, this charge being given as a percentage of these basic costs. Time spent in travelling in connexion with the Works is chargeable.

6. 4. In the case referred to under 6. 3, time spent by clerical staff in the head-office of the Consulting Engineer shall not be chargeable unless otherwise agreed upon.

*6. 5. If the remuneration is agreed upon as a percentage of the cost of the Works plus reimbursable costs according to 6. 1 under B that percentage shall be mentioned in the Agreement.

6. 6. If in the case referred to under 6. 5 the Works are carried out, as cost of the Works shall be considered unless otherwise agreed upon :

- (a) The amount certified to the Contractor, or the amount certified as cost of the Works if carried out by direct labour of Works designed, specified or supervised by the Consulting Engineer, before deduction of liquidated damages or penalties (if any) ;
- (b) A fair valuation of any labour, materials, manufactured goods or machinery provided by the Client and of the use and waste (including all cost of repairs) of constructional plant and equipment belonging to the Client which he shall require to be used in the carrying out of the Works ;
- (c) The market value as though they were purchased new, of any second-hand materials, manufactured goods and machinery incorporated in the Works.

The cost of the Works shall *not* include the following items :

- (i) Administrative expenses incurred by the Client ;
- (ii) Payments made to the Consulting Engineer ;
- (iii) Salaries, travelling, out-of-pocket and office expenses of resident site staff ;
- (iv) Interest on capital during construction and the cost of raising moneys required for carrying out the construction of the Works ;
- (v) Cost of land and way-leaves.

6. 7. If in the case referred to under 6. 5 the Works are not carried out, as cost of the Works shall be considered the lowest acceptable tender received for the execution of the Works or for lack of such the Consulting Engineer's estimate of costs submitted to the Client.

*6. 8. If the remuneration is agreed upon as a lump sum plus reimbursable costs according to 6. 1 under C the lump sum shall be mentioned in the Agreement.

6. 9. The following costs shall be regarded as reimbursable :

- (a) The costs of all available documents needed in connexion with the Agreement such as cadastral documents, maps, drawings, aerial photographs, records, reports, etc. ;

- (b) All costs of site surveys such as terrestrial and aerial surveys, soil mechanical surveys and laboratory investigations, borings, test piles, etc. ;
- (c) The costs of such specialized professional advice and laboratory investigations as may be obtained by agreement with the Client ;
- (d) The costs of instruments mentioned in the Agreement or afterwards agreed upon with the Client ;
- (e) Rents of instruments made available by the Consulting Engineer for the carrying out of the Agreement and investigations mentioned above and during the execution of the Agreement ;
- (f) The travelling, transport, board and lodging and other such expenses of the Consulting Engineer and his staff ;
- (g) The costs of reproduction, multiplication and dispatch of all documents, reports, drawings, maps, etc. ;
- (h) The costs of postage, telephones and telegrams in so far as they are not local ;
- (i) The costs of advertising for tenders.

*The following costs will equally be regarded as reimbursable subject to overhead charges as agreed upon :

- (j) The costs of shop drawings in the case of steel work and detailed drawings of reinforcement steel in the case of reinforced or prestressed concrete designs except in the case of remuneration on a time-salary basis ;
- (k) The costs of the Consulting Engineer's staff on site necessary for field investigations and for the supervision of the construction and administration of the Works by the Resident Staff ;
- (l) The costs of testing of materials and of the inspection and testing during manufacture and/or after delivery of such materials and plant as are usually inspected and tested by Consulting Engineers ;
- (m) The fees and expenses in connexion with lawsuits, arbitration proceedings etc. against or by third parties in so far as the assistance of the Consulting Engineer in this respect is required by the Client.

6. 10. In case of excessive delay on the part of the Client or of any Contractor or the taking by the Client of the Works or any part thereof out of the hands of any Contractor due to his failure properly to perform the relevant Contract, the Consulting Engineer shall be entitled to additional remuneration

6. 11. In the event of circumstances arising which could not have been reasonably foreseen, or in the event of the Client ordering modifications to completed designs or alterations to designs and/or investigations in progress, which require the alteration or remaking of any specification, drawing or other documents prepared in whole or in part by the Consulting Engineer, the whole of the cost of revising, amending or reproducing documents to bring the work of the Consulting Engineer up to the stage at which it was modified shall be the subject of additional payment, computed on a time basis together with all reimbursable costs incurred.

FINDINGS

(a) All flat areas which lay along the coast were under cultivation (vegetables, orange and banana groves). Some flat land was available in the proximity of the cities, but the prices were prohibitive for the establishment of salt ponds.

(b) The salinity of the sea water was constant along the whole coastline. Any other location would thus be more advantageous as far as concentration was concerned.

(c) The way in which the existing salt ponds were constructed was contrary to all known practices. The ponds were small in size, situated at random levels and made of the wrong materials.

It must be noted that salt ponds are usually located in large flat areas, where the tidal movement of the sea is used advantageously (no pumping, gates are opened at high tide and closed at low tide). Each of the individual evaporation and crystallization ponds usually has an area ranging from 1,000 to over 10,000 square metres. The bottom of the ponds is made of natural clay found on the spot, which has been rolled and compressed. The walls are built of the same material, though occasionally supported by wooden dykes. The ponds are constructed to allow the flow of brine into successive ponds.

(d) The technique of evaporating all the water and then collecting the residue was very crude. Brine was discarded at different concentrations by individual producers. The thin layer of salt was collected every time and then the pond filled up again. This allowed for about 12 to 15 harvests yearly.

The proper technique consists in evaporating the sea water up to 24° Beaume, whereby all the calcium sulphate will precipitate. Then the crystallization of sodium chloride from the brine follows from 24° Beaume to 28° Beaume, and the mother liquor containing all the bitters is discarded. Furthermore, the beds of salt should be harvested only once a year. This allows the salt bed to build up to a thickness of 10 to 12 or even 15 centimetres, and greatly facilitates the raking off of the salt and minimizes contamination from the materials of the pond bottoms.

Although this technique could not be fully applied, it was recommended as far as practicable because it would greatly improve the quality of the salt produced. Its limited applicability was due to the layout of the salt production fields and the random levels at which the ponds were situated.

(e) There was no correlation between the grading of locally produced salt and the percentage of its content of impurities. Wide variations in composition were observed from producer to producer. A salt graded "good" was less pure than a salt graded "bad", and a salt graded "fair" was purer than one graded "excellent".

REPORTING AND RECOMMENDATIONS

For the reasons given above, it was recommended that the production facilities should remain in their present location, but that adequate production techniques should be introduced to control densities between various concentration and crystallization stages.

As the method recommended was applicable only in part, the salt produced would still be impure. The method of counter-current, multi-stage washing

7. Payments

*7. 1. The Client shall pay to the Consulting Engineer advance payments to be mentioned in the Agreement as imprest accounts. These advance payments will be taken into account when the final payment is made.

*7. 2. If the Agreement concerns construction of Works, the Client shall pay to the Consulting Engineer unless otherwise agreed instalments at about the following stages of the Works, the proportions being stated in the Agreement:

- (a) On submission of the preliminary design;
- (b) On submission of the proposal for the definite design;
- (c) On submission of the tender documents;
- (d) On completion of the Works.

Provisions should also be made for payment of instalments during the construction period.

7. 3. If the remuneration is agreed on a time-salary basis according to 6. 1 under A, it will be payable monthly.

7. 4. If the remuneration is agreed as a percentage of the cost of the Works according to 6. 1 under B, the percentages mentioned under 7. 2 will be taken from the Consulting Engineer's estimates of cost of the Works.

7. 5. No matter how the remuneration is agreed upon the reimbursable costs shall be payable monthly.

7. 6. Remunerations shall be paid to the Consulting Engineer within one month after submission of the invoices by the Consulting Engineer. If the Client fails to pay the Consulting Engineer within three months after the date of submission of the invoice the Consulting Engineer is entitled to claim interest as from the date of the invoice.

7. 7. Unless otherwise agreed all payments to the Consulting Engineer shall be made into the Bank Account of the Consulting Engineer in his own country.

8. Currency

8. 1. Unless otherwise agreed, payments to the Consulting Engineer shall be made in the currency of his own country.

*8. 2. If payments are agreed in currency other than that of the Consulting Engineer's country, the rate of exchange shall be stated in the Agreement.

9. Damage

9. 1. If at any time before the completion of the Works under the Agreement any part of the Works or the equipment thereof shall be damaged or destroyed as a consequence of operations of war, political disturbance or other cause beyond the control of the Consulting Engineer, the Client shall pay to the Consulting Engineer the appropriate remuneration for any additional work which may be required to be designed and/or supervised by him as a result of such damage or destruction and a compensation for the damage resulting from such operation or cause.

THE ASSOCIATION OF CONSULTING ENGINEERS, LONDON
 MODEL FORM OF AGREEMENT "B"
 AND SCALE OF FEES²²

MEMORANDUM OF AGREEMENT

BETWEEN CLIENT AND CONSULTING ENGINEER FOR THE DESIGN AND SUPERVISION
 OF CIVIL, MECHANICAL AND ELECTRICAL WORKS

MEMORANDUM OF AGREEMENT made the day of 19....

BETWEEN

..... (hereinafter called
 "the Client") of the one part and

 (hereinafter called "the Consulting Engineer") of the other part.

WHEREAS the Client has considered and approved the general proposals
 recommended in a Report dated submitted by the
 Consulting Engineer and/or intends to proceed with

and has requested the Consulting Engineer to provide professional services in
 connection with

NOW IT IS HEREBY AGREED as follows:

1. The Client agrees to engage the Consulting Engineer subject to and in accordance with the Conditions of Engagement set out in the Schedule hereto and the Consulting Engineer agrees to provide professional services subject to and in accordance with the said Conditions of Engagement.
2. This Memorandum of Agreement and the said Conditions of Engagement shall together constitute the Agreement between the Client and the Consulting Engineer.
3. The Institution referred to in Clause 4 of the said Conditions of Engagement shall be the Institution of Engineers.
4. The method of payment for services under Clause 6 of the said Conditions of Engagement shall be that described in Clause 10.1*, 10.2*, 10.3* thereof.

²² The Association of Consulting Engineers, *Conditions of Engagement*, London, December, 1970.

* Delete as appropriate.

5. In the said Conditions of Engagement :
- (a) the fixed sum referred to in Clause 10. 2 shall be
 (£)*
- (b) the multiplier referred to in Clause 10. 3. 1 (a) shall be
- (c) the fee referred to in Clause 10. 3. 1 (b) shall be
- (£)*
- (d) the rate or rates referred to in Clause 11. 2 (a) shall be as follows

6. The intervals for the payment of instalments under Clause 20. 1 (a) of the said Conditions of Engagement shall be monthly/quarterly* intervals reckoned from the commencement of the Consulting Engineer's appointment, and the proportions referred to in the said subclause shall be as follows :—
- | | | |
|--------------------|-------|----------|
| Design Stage I | | per cent |
| Design Stage II | | per cent |
| Construction Stage | | per cent |
7. The sum payable under Clause 20. 1 (b) of the said Conditions of Engagement shall be paid in equal monthly/quarterly* instalments.
8. The additional services to be carried out in accordance with Clause 7. 2 (i) of the said Conditions of Engagement shall be

IN WITNESS whereof the parties have executed this MEMORANDUM OF AGREEMENT the day and year first above written.

Witness Client

Witness Consulting Engineer

GENERAL CONDITIONS

1. DEFINITIONS

In construing this Agreement the following expressions shall have the meanings hereby assigned to them except where the context otherwise requires :

"The Consulting Engineer" means the person or firm named in the Memorandum of Agreement and shall include any other person or persons taken into partnership by such person or firm during the currency of this Agreement and the surviving member or members of any such partnership.

"The Works" means the Works in connection with which the Client has engaged the Consulting Engineer to perform professional services.

* Delete as appropriate.

"The Contractor" means any person or persons firm or company under contract to the Client to perform work and/or supply goods in connection with the Works.

"Salary Cost" means the annual salary including bonuses of any person employed by the Consulting Engineer, divided by 1650 (being deemed to be the average annual total of effective working hours of an employee) and multiplied by the number of working hours spent by such person in performing any of the services in respect of which payment under this Agreement is to be made to the Consulting Engineer upon the basis of Salary Cost. For the purposes of this definition the annual salary of a person employed by the Consulting Engineer for a period less than a full year shall be calculated pro rata to such person's salary (including bonuses) for such lesser period.

"Other Payroll Cost" means the annual amount of all contributions and payments made by the Consulting Engineer on behalf of or in respect of a person employed by him for staff pension and life assurance schemes and also for National Health Insurance, Graduated Pension Fund, Selective Employment Tax and for any other tax, charge, levy, impost or payment of any kind whatsoever which the Consulting Engineer at any time during the performance of this Agreement is obliged by law to make on behalf of or in respect of such person, divided by 1650 (being deemed to be the average annual total of effective working hours of an employee) and multiplied by the number of working hours spent by such person in performing any of the services in respect of which payment under this Agreement is to be made to the Consulting Engineer upon the basis of Other Payroll Cost. For the purposes of this definition the annual amount of all contributions and payments made by the Consulting Engineer on behalf of or in respect of a person employed by him for a period less than a full year shall be calculated pro rata to the amount of such contributions and payments for such lesser period.

Words printed in italics are explanatory of the terms of these Conditions and do not form part thereof.

2. DURATION OF ENGAGEMENT

2.1. The appointment of the Consulting Engineer shall commence from the date of this Agreement or from the time when the Consulting Engineer shall have begun to perform for the Client any of the services specified in Clauses 6 and 7 of this Agreement, whichever is the earlier.

2.2. The Consulting Engineer shall not, without the consent of the Client, assign the benefit or in any way transfer the obligations of this Agreement or any part thereof.

2.3. If at any time the Client decides to postpone or abandon the Works, he may thereupon by notice in writing to the Consulting Engineer terminate the Consulting Engineer's appointment under this Agreement, provided that, in any case in which the Consulting Engineer is paid for his services under Clause 6 otherwise than in accordance with Clause 10.2. the Client may, when the Works or any part thereof are postponed, in lieu of so terminating the Consulting Engineer's appointment require the Consulting Engineer in writing to suspend the carrying out of his services under this Agreement for the time being.

2.4. If the Client shall not have required the Consulting Engineer to resume the performance of services in respect of any postponed work within a period of 12 months from the date of the Client's requirement to the Consulting Engineer

to suspend the carrying out of his services, such work shall be considered to have been abandoned and this Agreement shall terminate.

2. 5. In the event of the failure of the Client to comply with any of his obligations under this Agreement, or upon the occurrence of any circumstances beyond the control of the Consulting Engineer which are such as to delay for a period of more than 12 months or prevent or unreasonably impede the carrying out by the Consulting Engineer of his services under this Agreement, the Consulting Engineer may upon not less than 60 days' notice in writing to the Client terminate his appointment under this Agreement, provided that, in lieu of so terminating his appointment, the Consulting Engineer may

- (a) forthwith upon any such failure or the occurrence of any such circumstances suspend the carrying out of his services hereunder for a period of 60 days (provided that he shall as soon as practicable inform the Client in writing of such suspension and the reasons therefor), and
- (b) at the expiry of such period of suspension either continue with the carrying out of his services under this Agreement or else, if any of the reasons for the suspension then remain, forthwith in writing to the Client terminate his appointment under this Agreement.

2. 6. The Consulting Engineer shall, upon receipt of any notice or requirement in writing in accordance with Clause 2. 3 or the termination by him of his appointment in pursuance of Clause 2. 5, proceed in an orderly manner but with all reasonable speed and economy to take such steps as are necessary to bring to an end his services under this Agreement.

2. 7. Unless terminated under this clause the Consulting Engineer's appointment under this Agreement shall terminate when the Consulting Engineer shall make and issue the certificate authorising the final payment to the Contractor.

2. 8. Any termination of the Consulting Engineer's appointment under this Agreement shall not prejudice or affect the accrued rights or claims of either party to this Agreement.

3. OWNERSHIP OF DOCUMENTS AND COPYRIGHT

3. 1. The copyright in all drawings, reports, specifications, bills of quantities, calculations and other similar documents provided by the Consulting Engineer in connection with the Works shall remain vested in the Consulting Engineer, but the Client shall have a licence to use such drawings and other documents for the purpose of constructing the Works. Save as aforesaid, the Client shall not make copies of such drawings or other documents nor shall he use the same in connection with the making or improvement of any works other than those comprised in the Works without the prior written approval of the Consulting Engineer and upon such terms as may be agreed between the Client and the Consulting Engineer.

3. 2. The Consulting Engineer may with the consent of the Client, which consent shall not be unreasonably withheld, publish alone or in conjunction with any other person any articles, photographs or other illustrations relating to the Works.

4. SETTLEMENT OF DISPUTES

Any dispute or difference arising out of this Agreement shall be referred to the arbitration of a person to be agreed upon between the Client and the Consulting Engineer or, failing agreement, nominated by the President for the time being of the Institution named in the Memorandum of Agreement.

OBLIGATIONS OF CONSULTING ENGINEER

5. CARE AND DILIGENCE

The Consulting Engineer shall exercise all reasonable skill, care and diligence in the discharge of the services agreed to be performed by him. If in the performance of his services the Consulting Engineer has a discretion exercisable as between the Client and the Contractor, the Consulting Engineer shall exercise his discretion fairly.

6. NORMAL SERVICES

6. 1. Design Stage I

The services to be provided by the Consulting Engineer at this stage shall comprise all or any of the following as may be necessary in the particular case:—

- (a) Investigating data and information relevant to the Works which are reasonably accessible to the Consulting Engineer, and considering any reports relating to the Works which have either been previously prepared by the Consulting Engineer or else prepared by others and made available to the Consulting Engineer by the Client.
- (b) Making any normal topographical survey of the proposed site of the Works which may be necessary to supplement the topographical information already available to the Consulting Engineer.
- (c) Advising the Client on the need to carry out any geotechnical investigations which may be necessary to supplement the geotechnical information already available to the Consulting Engineer, arranging for such investigations when authorised by the Client, certifying the amount of any payments to be made by the Client to the persons or firms carrying out such investigations under the Consulting Engineer's direction, and advising the Client on the results of such investigations.
- (d) Advising the Client on the need for arrangements to be made, in accordance with Clause 7, for the carrying out of special surveys, special investigations or model tests, and advising the Client of the results of any such surveys, investigations or tests carried out.
- (e) Consulting any Architect appointed by the Client in connection with the architectural treatment of the Works.
- (f) Preparing such documents as are reasonably necessary to enable the Client to consider the Consulting Engineer's general proposals for the construction of the Works in the light of the investigations carried out by him at this stage, and to enable the Client to apply for approval in principle of the execution of the Works in accordance with such proposals.

6. 2. Design Stage II

The services to be provided by the Consulting Engineer at this stage shall comprise all or any of the following as may be necessary in the particular case:—

- (a) Preparing designs and tender drawings in connection with the Works.
- (b) Advising as to the appropriate conditions of contract to be incorporated in any contract to be made between the Client and a Contractor.
- (c) Preparing such specifications, schedules and bills of quantities as may be necessary to enable the Client to obtain tenders or otherwise award a contract for carrying out the Works.

- (d) Advising the Client as to the suitability for carrying out the Works of persons and firms tendering and further as to the relative merits of tenders, prices and estimates received for carrying out the Works.

As soon as the Consulting Engineer shall have submitted advice to the Client upon tenders, his services at this stage shall be complete.

6. 3. Construction Stage

The Consulting Engineer shall not accept any tender in respect of the Works unless the Client gives him instructions in writing to do so, and any acceptance so made by the Consulting Engineer on the instructions of the Client shall be on behalf of the Client. The services to be provided by the Consulting Engineer at this stage shall include all or any of the following as may be necessary in the particular case:—

- (a) Advising on the preparation of formal contract documents relating to accepted tenders for carrying out the Works or any part thereof.
- (b) Inspecting and testing during manufacture and installation such electrical and mechanical materials, machinery and plant supplied for incorporation in the Works as are usually inspected and tested by Consulting Engineers, and arranging and witnessing acceptance tests.
- (c) Advising the Client on the need for special inspection or testing other than that referred to in subclause (b).
- (d) Advising the Client on the appointment of site-staff in accordance with Clause 8.
- (e) Preparing bar bending schedules and any further designs and drawings which may be necessary.
- (f) Examining the Contractor's proposals.
- (g) Making such visits to site as the Consulting Engineer shall consider necessary to satisfy himself as to the performance of any site-staff appointed pursuant to Clause 8, and to satisfy himself that the Works are executed generally according to contract and otherwise in accordance with good engineering practice.
- (h) Giving all necessary instructions to the Contractor, provided that the Consulting Engineer shall not without the prior approval of the Client give any instructions which in the opinion of the Consulting Engineer are likely substantially to increase the cost of the Works unless it is not in the circumstances practicable for the Consulting Engineer to obtain such prior approval.
- (i) Issuing certificates for payment to the Contractor.
- (j) Performing any services which the Consulting Engineer may be required to carry out under any contract for the execution of the Works, including where appropriate the supervision of any specified tests and of the commissioning of the Works, provided that the Consulting Engineer may decline to perform any services specified in a contract the terms of which have not initially been approved by the Consulting Engineer.
- (k) Delivering to the Client on the completion of the Works such records and manufacturers' manuals as are reasonably necessary to enable the Client to operate and maintain the Works.
- (l) Deciding any dispute or difference arising between the Client and the Contractor and submitted to the Consulting Engineer for his decision, provided that this service shall not extend to advising the Client

following the taking of any step in or towards any arbitration or litigation in connection with the Works.

6. 4. General

Without prejudice to the preceding provisions of this clause, the Consulting Engineer shall from time to time as may be necessary advise the Client as to the need for the Client to be provided with additional services in accordance with Clause 7.

7. ADDITIONAL SERVICES NOT INCLUDED IN NORMAL SERVICES

7. 1. As services additional to those specified in Clause 6, the Consulting Engineer shall, if so requested by the Client, provide any of the services specified in Clause 7. 2 and provide or take all reasonable steps to arrange for the provision of any of the services specified in Clause 7. 3.

7. 2. (a) Preparing any report or additional contract documents required for consideration of proposals for the carrying out of alternative works.
- (b) Carrying out work consequent upon a decision by the Client to seek parliamentary powers.
- (c) Carrying out work in connection with any application already made by the Client for any order, sanction, licence, permit or other consent, approval or authorisation necessary to enable the Works to proceed.
- (d) Carrying out work arising from the failure of the Client to award a contract in due time.
- (e) Preparing details for shop fabrication of ductwork, metal or plastic frameworks.
- (f) Carrying out work consequent upon any assignment of a contract by the Contractor or upon the failure of the Contractor properly to perform any contract or upon delay by the Client in fulfilling his obligations under Clause 9 or in taking any other step necessary for the due performance of the Works.
- (g) Advising the Client and carrying out work following the taking of any step in or towards any litigation or arbitration relating to the Works.
- (h) Carrying out work in conjunction with others employed to provide any of the services specified in Clause 7. 3.
- (i) Carrying out such other additional services, if any, as are specified in Clause 8 of the Memorandum of Agreement.
7. 3. (a) Specialist technical advice on any abnormal aspects of the Works.
The services provided by the Consulting Engineer under Clause 6 will include the provision of all expert technical advice and skills which are normally required for the class of work for which the Consulting Engineer's services are engaged.
- (b) Architectural, legal, financial and other professional services.
- (c) Services in connection with the valuation, purchase, sale or leasing of lands and the obtaining of wayleaves.
- (d) The carrying out of marine and air surveys, and land surveys other than those referred to in Clause 6, and the making of model tests or special investigations.
- (e) The carrying out of special inspections or tests advised by the Consulting Engineer under sub-clause 6. 3 (c).

7.4. The Consulting Engineer shall obtain the prior agreement of the Client to the arrangements which he proposes to make on the Client's behalf for the provision of any of the services specified in Clause 7.3. The Client shall be responsible to any person or persons providing such services for the cost thereof.

8. SUPERVISION ON SITE

8.1. If in the opinion of the Consulting Engineer the nature of the Works, including the carrying out of any geotechnical investigation pursuant to Clause 6.1, warrants full-time or part-time engineering supervision on site, the Client shall not object to the appointment of such suitably qualified technical and clerical site-staff as the Consulting Engineer shall consider reasonably necessary to enable such supervision to be carried out.

8.2. Persons appointed pursuant to the previous sub-clause shall be employed either by the Consulting Engineer or, if the Client and the Consulting Engineer shall so agree, by the Client directly, provided that the Client shall not employ any person as a member of the site-staff unless the Consulting Engineer has first selected or approved such person as suitable for employment.

8.3. The terms of service of all site-staff to be employed by the Consulting Engineer shall be subject to the approval of the Client, which approval shall not be unreasonably withheld.

8.4. The Client shall procure that the contracts of employment of site-staff employed by the Client shall stipulate that the person employed shall in no circumstances take or act upon instructions other than those of the Consulting Engineer.

8.5. Where any of the services specified in Clause 6.3 are performed by site-staff employed by the Client, the Consulting Engineer shall not be responsible for any failure on the part of such staff properly to comply with any instructions given by the Consulting Engineer.

OBLIGATIONS OF CLIENT

9. INFORMATION TO BE SUPPLIED TO THE CONSULTING ENGINEER

9.1. The Client shall supply to the Consulting Engineer, without charge and within a reasonable time, all necessary and relevant data and information in the possession of the Client and shall give such assistance as shall reasonably be required by the Consulting Engineer in the performance of his services under this Agreement.

9.2. The Client shall give his decision on all sketches, drawings, reports, recommendations, tender documents and other matters properly referred to him for decision by the Consulting Engineer in such reasonable time as not to delay or disrupt the performance by the Consulting Engineer of his services under this Agreement.

10. PAYMENT FOR NORMAL SERVICES

Three alternative methods of payment for services carried out under Clause 6 are detailed in the three succeeding Clauses 10.1, 10.2 and 10.3. The method of payment which the Client and the Consulting Engineer agree to adopt must be specified in the Memorandum of Agreement. It should be noted that the method of payment specified in Clause 10.3 extends also to services other than those carried out under Clause 6.

10. 1. Payment depending upon the actual cost of the Works.

This method of payment is recommended for use in normal circumstances.

10. 1. 1 The sum payable by the Client to the Consulting Engineer for his services under Clause 6 shall be calculated as follows:—

- (a) The Works shall first be classified into one or more of the following classes as shall be appropriate:—

Class 1: Structural work in reinforced concrete, prestressed concrete, steel and other metals.

Class 2: Buildings including engineering systems associated with buildings, but excluding Class 1 work.

Class 3: Civil engineering including geotechnical investigation, but excluding Class 1 and Class 2 work.

Class 4: Mechanical and electrical plant and equipment.

- (b) The cost of each relevant class of work shall next be calculated, and

- (c) The sum payable by the Client to the Consulting Engineer shall then be calculated and shall be an amount or the sum of the amounts calculated in respect of each relevant class of work in accordance with the Scales of Charges set out in Clause 10. 1. 3 where the cost of the class of work is not less than £10,000, or in accordance with the Scale of Charges in Clause 11 or otherwise as may be agreed between the Client and the Consulting Engineer, where the cost of the class of work is less than £10,000.

10. 1. 2 The cost of work shall be calculated in accordance with Clause 19. Where the Works have been classified in accordance with Clause 10. 1. 1 into more than one class, there shall be attributed to each class an appropriate portion of any "General or Preliminary Items" included in the total cost of the Works, so that the total cost of all classes of work shall equal the total cost of the Works. In the classification of the Works, Class 1 work shall be taken to include concrete, reinforcement, prestressing tendons and anchorages, formwork, inserts and all labours.

10. 1. 3 The Scales of Charges* referred to in Clause 10. 1. 1 are as follows:

Cost of class of work	Charge for Class 1 work	Charge for Class 2 or Class 3 or Class 4 work
On the first £ 10,000	15 %	11 %
On the next £ 15,000	13 %	9 %
On the next £ 25,000	11½ %	7½ %
On the next £ 50,000	9¾ %	6½ %
On the next £ 100,000	8¼ %	6 %
On the next £ 300,000	7¼ %	5½ %
On the next £ 500,000	6½ %	5 %
On the next £1,000,000	6¼ %	4½ %
On the next £2,000,000	6 %	4¼ %
On the next £4,000,000	5¾ %	4 %
On the remainder	5¼ %	3¾ %

The charge for Class I work can also be calculated conveniently from the appropriate line of the following table:

* Suitable for work of average complexity.

with concentrated brine, followed by drying, was suitable for solving the problem. Though it would produce salt of 99.6 to 99.7 per cent purity, such salt would be good enough for all industrial purposes. About 25 per cent of the salt refined would be crushed, sized, treated and packaged for table use. The recommended capacity of the refining plant was 15,000 tons *per annum*. In addition, the report included the following:

- (a) Flow sheet and general layout of the salt refinery;
- (b) Listing and general description and prices of individual pieces of equipment (name, number and size);
- (c) Materials balance and expected yields;
- (d) General building, land, equipment, labour, fuel and packaging requirements;
- (e) Capital requirements and production costs.

The capital requirements were as follows:

	<i>U.S. dollars</i>
Erected equipment cost (including consultancy fee)	184,000
Buildings and engineering	94,000
Land	15,000
Estimated working capital, including raw materials, product inventory and credit	35,000
	328,000

The production cost was based on the assumption that crude salt contained 80 per cent pure salt and that, after taking into consideration stock pile loss and loss in discarded liquors, the yield would be equivalent to 70 per cent.

<i>Production costs</i>	<i>U.S. cents</i>
Crude salt at 1.85 cents/kg	2.650
Labour and personnel	0.420
Utilities	0.148
Maintenance and supplies	0.170
Depreciation, taxes, insurance	0.220
	3.608 cents/kg

The suggested selling prices, based on current market trends, were the following:

	<i>Refined (dried, in 50-kg sacks)</i>	<i>Refined (treated, in 1-kg sacks)</i>
	<i>cents/kg</i>	<i>cents/kg</i>
Manufacturing cost (including packaging)	3.9500	6.5500
Promotion	0.0164	0.6550
Delivery to consumer centres	0.1640	0.1640
Syndicate profit and reserves	0.4750	1.5200
	4.6054	8.8890
Rounded to:	4.6 cents/kg	8.9 cents/kg

Since the salt produced would be of better quality, it would command a higher price than the local crude salt originally produced.

Cost of Class 1 work		Charge	
From £ 10,000 to £ 25,000	£ 1,500	+ 13 % of balance over £ 10,000	£ 10,000
£ 25,000 to £ 50,000	£ 3,450	+ 11½% of balance over £ 25,000	£ 25,000
£ 50,000 to £ 100,000	£ 6,325	+ 9¾% of balance over £ 50,000	£ 50,000
£ 100,000 to £ 200,000	£ 11,200	+ 8¼% of balance over £ 100,000	£ 100,000
£ 200,000 to £ 500,000	£ 19,450	+ 7¼% of balance over £ 200,000	£ 200,000
£ 500,000 to £ 1,000,000	£ 41,200	+ 6½% of balance over £ 500,000	£ 500,000
£ 1,000,000 to £ 2,000,000	£ 73,700	+ 6¼% of balance over £ 1,000,000	£ 1,000,000
£ 2,000,000 to £ 4,000,000	£ 136,200	+ 6 % of balance over £ 2,000,000	£ 2,000,000
£ 4,000,000 to £ 8,000,000	£ 256,200	+ 5¾% of balance over £ 4,000,000	£ 4,000,000
Over £ 8,000,000	£ 486,200	+ 5¼% of balance over £ 8,000,000	£ 8,000,000

The charge for Class 2, or Class 3 or Class 4 work can also be calculated conveniently from the appropriate line of the following table:

Cost of Class 2 or Class 3 or Class 4 work		Charge	
From £ 10,000 to £ 25,000	£ 1,100	+ 9 % of balance over £ 10,000	£ 10,000
£ 25,000 to £ 50,000	£ 2,450	+ 7½% of balance over £ 25,000	£ 25,000
£ 50,000 to £ 100,000	£ 4,325	+ 6½% of balance over £ 50,000	£ 50,000
£ 100,000 to £ 200,000	£ 7,575	+ 6 % of balance over £ 100,000	£ 100,000
£ 200,000 to £ 500,000	£ 13,575	+ 5½% of balance over £ 200,000	£ 200,000
£ 500,000 to £ 1,000,000	£ 30,075	+ 5 % of balance over £ 500,000	£ 500,000
£ 1,000,000 to £ 2,000,000	£ 55,075	+ 4½% of balance over £ 1,000,000	£ 1,000,000
£ 2,000,000 to £ 4,000,000	£ 100,075	+ 4¼% of balance over £ 2,000,000	£ 2,000,000
£ 4,000,000 to £ 8,000,000	£ 185,075	+ 4 % of balance over £ 4,000,000	£ 4,000,000
Over £ 8,000,000	£ 345,075	+ 3¾% of balance over £ 8,000,000	£ 8,000,000

10.1.4 If the Client decides to have the Works constructed in more than one phase and as a consequence the services which it may be necessary for the Consulting Engineer to perform under Clause 6 have to be undertaken by the Consulting Engineer separately in respect of each phase, then the provisions of this payment clause shall apply separately to each phase and as if the expression "the Works" as used in this clause meant, in the case of each phase, the work comprised in that phase.

10.2. Payment of a fixed sum

This method of payment may be used when

- the nature of the Works and the services to be provided can be closely defined and are unlikely to change significantly, and*
- the Client and the Consulting Engineer have both approved an itemised estimate of the cost of the Works, and*
- there are good prospects of the construction stage following the design stages without delay.*

Ordinarily the fixed sum will not be less than that deductible from Clause 10.1 using, instead of the actual cost of each separate class of work, the estimates thereof approved by the Client and the Consulting Engineer at the time of the Consulting Engineer's appointment.

The sum payable by the Client to the Consulting Engineer for his services under Clause 6 shall be the sum specified in Clause 5(a) of the Memorandum of Agreement, provided that the Consulting Engineer shall, in addition to the

said sum, be paid in accordance with Clause 11.2 for any services of the kind specified in Clause 6.3(1) which it is necessary for him to provide.

10.3. Payment on the basis of Salary Cost times multiplier, plus Other Payroll Cost plus fee.

This method of payment may be used when

- (a) *the extent and duration of services to be provided by the Consulting Engineer are difficult to foresee at the time of appointment, or*
- (b) *the services are likely to be substantially different from those described in Clause 6, or*
- (c) *the time likely to be devoted by the Consulting Engineer bears little relation to the value of the Works.*

The fee referred to in Clause 10.3.1(b) may be agreed as a rate per month payable for the duration of this Agreement or alternatively as a lump sum.

10.3.1 In respect of services provided by the Consulting Engineer under the following Clauses:

Clause 6	Normal Services
Clause 7	Additional Services
Clause 12	Computer, etc.
Clause 13.3	Site Visits
Clause 15	Alterations, etc.
Clause 16	Works Damaged, etc.

the Client shall pay the Consulting Engineer

- (a) Technical and supporting staff Salary Cost times the multiplier specified in Clause 5(b) of the Memorandum of Agreement, plus Other Payroll Cost.
- (b) The fee specified in Clause 5(c) of the Memorandum of Agreement, which shall be deemed to cover the services of Partners and Consultants of the firm but not their expenses which are reimbursable separately under Clause 14(c).
- (c) Any charge for the use of a computer or other special equipment payable under Clause 12(d).

10.3.2 Time spent by technical and supporting staff in travelling in connection with the Works shall be chargeable on the above basis.

10.3.3 Unless otherwise agreed between the Client and the Consulting Engineer, the Consulting Engineer shall not be entitled to any payment in respect of time spent by secretarial staff or by staff engaged on general accountancy or administration duties in the Consulting Engineer's office.

10.3.4 The Consulting Engineer shall submit to the Client at the time of submission of the monthly accounts referred to in Clause 20 such supporting data as may be agreed between the Client and the Consulting Engineer.

11. PAYMENT FOR ADDITIONAL SERVICES

11.1 In respect of additional services provided by the Consulting Engineer under Clause 7, the Client shall, subject to Clause 10.3, pay the Consulting Engineer in accordance with the Scale of Charges set out in Clause 11.2.

11.2 Scale of Charges:—

- (a) Partners and Consultants: At the hourly rate or rates specified in Clause 5(d) of the Memorandum of Agreement.

- (b) Technical and supporting staff: Salary Cost times 2.5, plus Other Payroll Cost.
- (c) Time spent by Partners, Consultants, technical and supporting staff in travelling in connection with the Works shall be chargeable on the above basis.
- (d) Unless otherwise agreed between the Client and the Consulting Engineer, the Consulting Engineer shall not be entitled to any payment in respect of time spent by secretarial staff or by staff engaged on general accountancy or administration duties in the Consulting Engineer's office.

12. PAYMENT FOR USE OF COMPUTER OR OTHER SPECIAL EQUIPMENT

Where the Client has agreed to pay the Consulting Engineer

- (a) in accordance with Clause 10.3 and the Consulting Engineer decides to use a computer or other special equipment in the carrying out of any of his services, or
- (b) for his services under Clause 6 in accordance with Clause 10.1 or 10.2 and the Consulting Engineer decides to use a computer or other special equipment in carrying out any additional services in accordance with Clause 7 or is expressly required by the Client to use a computer or other special equipment in the carrying out of his services under Clause 6, the Client shall, unless otherwise agreed between the Client and the Consulting Engineer, pay the Consulting Engineer
- (c) for the time spent in connection with the use of a computer or other special equipment, including the development and writing of programmes and the operation of the computer in trial and final runs, in accordance with Clause 10.3 when applicable and otherwise in accordance with the Scale of Charges set out in Clause 11.2, and
- (d) a reasonable charge for the use of the computer or other special equipment, which charge shall, if possible, be agreed between the Client and the Consulting Engineer before the work is put in hand.

13. PAYMENT FOR SITE SUPERVISION

13.1. In addition to any other payment to be made by the Client to the Consulting Engineer under this Agreement, the Client shall

- (a) reimburse the Consulting Engineer in respect of all salary and wage payments made by the Consulting Engineer to site-staff employed by the Consulting Engineer pursuant to Clause 8 and in respect of all other expenditure incurred by the Consulting Engineer in connection with the selection, engagement and employment of site-staff, and
- (b) pay to the Consulting Engineer a sum calculated at 7 per cent of the amounts payable to the Consulting Engineer under the preceding sub-clause in respect of head office overhead costs incurred on site-staff administration,

provided that in lieu of payments under (a) and (b) above the Client and the Consulting Engineer may agree upon inclusive monthly or other rates to be paid by the Client to the Consulting Engineer for each member of site-staff employed by the Consulting Engineer.

13.2. The Client shall also in all cases be responsible for the cost of providing such local office accommodation, furniture, telephones, equipment and transport

as shall be reasonably necessary for the use of site-staff appointed pursuant to Clause 8, and for the reasonable running costs of such necessary local office accommodation and other facilities, including those of stationary, telephone calls, telegrams and postage. Unless otherwise agreed between the Client and the Consulting Engineer, the Consulting Engineer shall arrange, whether through the Contractor or otherwise, for the provision of local office accommodation and facilities for the use of site-staff.

13. 3. In cases where the Consulting Engineer has thought it proper that site-staff should not be appointed, or where the necessary site-staff is not available at site due to sickness or any other cause, the Consulting Engineer shall, subject to Clause 10. 3, be paid in accordance with the Scale of Charges set out in Clause 11. 2 for site visits which would have been unnecessary but for the absence or non-availability of site-staff.

14. DISBURSEMENTS

The Client shall in all cases reimburse the Consulting Engineer in respect of all the Consulting Engineer's disbursements properly made in connection with:—

- (a) Printing, reproduction and purchase of all documents, drawings, maps and records.
- (b) Telegrams and telephone calls other than local.
- (c) Travelling, hotel expenses and other similar disbursements.
- (d) Advertising for tenders and for site-staff.
- (e) The provision of additional services to the Client pursuant to Clause 7. 4.

The Client may, however, by agreement between himself and the Consulting Engineer make to the Consulting Engineer a lump sum payment or payment of a sum calculated as a percentage charge on the cost of the Works in satisfaction of his liability to the Consulting Engineer in respect of the Consulting Engineer's disbursements.

15. PAYMENT FOR ALTERATION OR MODIFICATION TO DESIGN

If after the completion by the Consulting Engineer of his services under Clause 6. 1, or where the Client has agreed to make payment to the Consulting Engineer in accordance with Clause 10.2 at any time after the date of this Agreement, any design whether completed or in progress or any specification, drawing or other document prepared in whole or in part by the Consulting Engineer shall require to be modified or revised by reason of instructions received by the Consulting Engineer from the Client, or by reason of circumstances which could not reasonably have been foreseen, then the Client shall make additional payment to the Consulting Engineer for making any necessary modifications or revisions and for any consequential reproduction of documents. Subject to Clause 10. 3, and unless otherwise agreed between the Client and the Consulting Engineer, the additional sum to be paid to the Consulting Engineer shall be calculated in accordance with the Scale of Charges set out in Clause 11. 2, and shall also include any appropriate reimbursements in accordance with Clause 14.

16. PAYMENT WHEN WORKS ARE DAMAGED OR DESTROYED

If at any time before completion of the Works any part of the Works or any materials, plant or equipment whether incorporated in the Works or not shall

be damaged or destroyed, the Client shall make additional payment to the Consulting Engineer in respect of any expenses incurred or additional work required to be carried out by the Consulting Engineer as a result of such damage or destruction. Subject to Clause 10.3, the amount of such additional payment shall be calculated in accordance with the Scale of Charges set out in Clause 11.2, and shall also include any appropriate reimbursements in accordance with Clause 14.

17. PAYMENT FOLLOWING TERMINATION OR SUSPENSION BY THE CLIENT

17.1 Upon a termination or suspension by the Client in pursuance of Clause 2.3, the Client shall pay to the Consulting Engineer the sums specified in (a), (b) and (c) of this sub-clause (less the amount of payments previously made to the Consulting Engineer under the terms of this Agreement).

- (a) A fair and reasonable proportion of the sum which would have been payable to the Consulting Engineer under Clause 10 if no such termination or suspension had taken place. In the assessment of such proportion, the services carried out by the Consulting Engineer up to the date of termination or suspension and in pursuance of Clause 2.6 shall be compared with a reasonable assessment of the services which the Consulting Engineer would have carried out but for the termination or suspension. In any case in which it is necessary to assess the payment to be made to the Consulting Engineer in accordance with this sub-clause by reference to the cost of the Works, then to the extent that such cost is not known the assessment shall be made upon the basis of the Consulting Engineer's best estimates of cost.
- (b) Amounts due to the Consulting Engineer under any other clauses of this Agreement.
- (c) A disruption charge equal to one sixth of the difference between the sum which would have been payable to the Consulting Engineer under Clause 10, but for the termination or suspension, and the sum payable under (a) above.

17.2. In any case in which the Client has required the Consulting Engineer to suspend the carrying out of the Consulting Engineer's services in pursuance of the power conferred by Clause 2.3, the Client may, at any time within the period of 12 months from the date of his requirement in writing to the Consulting Engineer to suspend the carrying out of the Consulting Engineer's services, require the Consulting Engineer in writing to resume the performance of such services. In such event

- (a) the Consulting Engineer shall within a reasonable time of receipt by him of the Client's said requirement in writing resume the performance of his services in accordance with this Agreement, the payment made under Clause 17.1(a) ranking as payment on account towards the total sum payable to the Consulting Engineer under Clause 10, but
- (b) notwithstanding such resumption the Consulting Engineer shall be entitled to retain or receive as an additional payment due in accordance with this Agreement the disruption charge referred to in Clause 17.1(c).

17.3 If the Consulting Engineer shall need to perform any additional services in connection with the resumption of his services in accordance with Clause 17.2 the Client shall pay the Consulting Engineer in respect of the performance

of such additional services in accordance as the case may be with Clause 10. 3 or the Scale of Charges set out in Clause 11, and any appropriate reimbursements in accordance with Clause 14.

18. PAYMENT FOLLOWING TERMINATION BY THE CONSULTING ENGINEER

Upon a termination by the Consulting Engineer in pursuance of Clause 2. 5, the Client shall pay to the Consulting Engineer the sums specified in Clause 17. 1(a) and (b) (less the amount of payments previously made to the Consulting Engineer under the terms of this Agreement). Upon payment of such sums, the Consulting Engineer shall deliver to the Client such completed drawings, specifications and other similar documents relevant to the Works as are in his possession. The Consulting Engineer shall be permitted to retain copies of any documents so delivered to the Client.

19. COST OF THE WORKS

19.1 The cost of the Works or any part thereof shall be deemed to include:—

- (a) The cost to the Client of the Works however incurred, including any payments (before deduction of any liquidated damages or penalties payable by the Contractor to the Client) made by the Client to the Contractor by way of bonus, incentive or ex-gratia payments, or in settlement of claims.
- (b) A fair valuation of any labour, materials, manufactured goods, machinery or other facilities provided by the Client, and of the full benefit accruing to the Contractor from the use of construction plant and equipment belonging to the Client which the Client has required to be used in the execution of the Works.
- (c) The market value, as if purchased new, of any second-hand materials, manufactured goods and machinery incorporated in the Works.
- (d) The cost of geotechnical investigations (Clause 6. 1(c)).
- (e) A fair proportion of the total cost to the Client of any work in connection with the provision or diversion of public utilities systems which is carried out, other than by the Contractor, under arrangements made by the Consulting Engineer. The said fair proportion shall be assessed with reference to the costs incurred by the Consulting Engineer in making such arrangements.

19.2 The cost of the Works shall not include:—

- (a) Administration expenses incurred by the Client.
- (b) Costs incurred by the Client under this Agreement.
- (c) Interest in capital during construction, and the cost of raising moneys required for carrying out the construction of the Works.
- (d) Cost of land and wayleaves.

20. PAYMENT OF ACCOUNTS

20.1 Unless otherwise agreed between the Client and the Consulting Engineer from time to time

- (a) the sum payable to the Consulting Engineer under Clause 10.1 shall, until the cost of the Works is known, be paid by the Client to the Consulting Engineer in instalments and shall be calculated by reference to the Consulting Engineer's most recent estimate of the cost of the Works incorporating when available any accepted tender or tenders. Such instalments shall be paid during each of the several stages of the Consulting Engineer's services at the intervals specified in Clause 6 of the Memorandum of Agreement so that by the end of each stage there shall have been paid the relevant proportion, as specified in Clause 6 of the Memorandum of Agreement, of the estimated total sum payable to the Consulting Engineer under this Agreement.

The following table, provided for guidance only, is typical of the proportionate amount of services in each stage:

	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>
<i>Design Stage I</i>	20%	20%	20%
<i>Design Stage II</i>	50%	40%	30%
<i>Construction Stage</i>	30%	40%	50%

Alternative 1 may be appropriate for civil engineering work and buildings where the majority of drawings are prepared before the construction stage is reached.

Alternative 2 may be appropriate for civil engineering work and buildings where the majority of drawings are prepared during the construction stage.

Alternative 3 may be appropriate for mechanical and electrical plant.

- (b) the sum payable to the Consulting Engineer under Clause 10.2 or 10.3.1(b) (as the case may be) shall be paid by the Client in the instalments and at the intervals stated in Clause 7 of the Memorandum of Agreement.
- (c) all sums due to the Consulting Engineer under Clauses 10.3.1(a), 11, 12, 13 and 14 shall be paid by the Client on accounts rendered monthly by the Consulting Engineer.

20.2 Instalments paid by the Client to the Consulting Engineer in accordance with Clause 20.1(a) shall constitute no more than payments on account, and the total sum due to the Consulting Engineer shall be determined when the cost of the Works is fully known.

20.3 All sums due from the Client to the Consulting Engineer in accordance with the terms of this Agreement shall be paid within 40 days of the submission by the Consulting Engineer of his accounts therefor to the Client, and any sums remaining unpaid at the expiry of such period of 40 days shall bear interest thereafter such interest to accrue from day to day at the rate of 2% per annum above the current Bank Rate.

20.4 If any item or part of an item of an account rendered by the Consulting Engineer is disputed or subject to question by the Client, the payment by the Client of the remainder of that account shall not be withheld on those grounds and the provisions of Clause 20.3 shall apply to such remainder and also to the disputed or questioned item to the extent that it shall subsequently be agreed or determined to have been due to the Consulting Engineer.

THE ASSOCIATION OF CONSULTING ENGINEERS OF CANADA
SCHEDULE OF MINIMUM FEES FOR PROFESSIONAL
ENGINEERING SERVICES²³

SECTION I
CATEGORIES OF SERVICES

For the purpose of determining an appropriate fee basis, consulting services are divided into the following five categories :

- I. Advisory Services
- II. Pre-Design Services
- III. Design Services
- IV. General Engineering Services During Construction
- V. Resident Engineering Services

The categories of services are explained in detail in the following paragraphs :

Category I—Consultative and advisory services

These consist of consultative and advisory services such as :

- i. Project management
- ii. Expert testimony
- iii. Appraisals
- iv. Valuations
- v. Rate structure and tariff studies
- vi. Inspection, testing or other services concerning the collection, analysis, evaluation and interpretation leading to specialized conclusions and recommendations.

Category II—Pre-design services

These consist of services to establish requirements for design and include such matters as:

- i. Investigation
- ii. Exploration
- iii. Survey and soil investigation
- iv. Analysis of conditions and of several alternative plans, including operating costs, financial considerations and similar matters, as a basis for conclusions and recommendations on the undertaking of a suggested project.

Category III—Design services

These consist of the preparation of engineering designs, drawings and specifications with appropriate contract documents. Design services follow after the basis for design has been established under Categories I and II.

"Design" shall include the following services:—

- a) Analysis of data for design based on requirements established by the client.
- b) Preparation of preliminary sketches and development of specification notes.

²³ The Association of Consulting Engineers of Canada, *Tariff of Fees and General Conditions*, Toronto, March 1968, pp. 2—9.

- c) Preparation of working drawings.
- d) Preparation of specifications.
- e) Calling for tenders.

Prints needed for the proper planning of the work shall be exchanged between the Consultant and Client on a free reciprocal basis. Unless otherwise agreed, all original design notes, drawings and specifications are the property of the Consultant. The Client is entitled to a copy of the plans and specifications for record purposes only, and he shall not use or permit the use of any of these for the construction of another project without obtaining the consent of and remunerating the Consultant for the use of said plans and specifications as hereafter provided.

Category IV—General engineering services during construction

These consist of office and field services during the construction period following the award of contract.

As used in this schedule, "General Engineering Services During Construction" shall include the following services :

- a) Approval of shop drawings as provided for in the terms of the construction contract.
- b) Periodic visits to the site by the Consultant or his duly authorized representative to familiarize himself generally with the progress and quality of the work and to determine in general if work is proceeding in accordance with contract documents.
- c) Keeping the Client informed on the progress of the work and endeavoring to guard the Client against defects and deficiencies in the work.
- d) Guidance to the Contractor in the interpretation of plans and specifications to assist him to carry out the work.
- e) Examination of progress claims for the purpose of approving progress payments.

Under Category IV, the Consultant is not expected to make exhaustive or continuous on-site inspections. "Engineering Services" as herein described do not include the direction of persons or selection or direction of methods and equipment employed by the Contractor in any phase of the construction or placing in operation of any plant or equipment unless otherwise provided for in the documents of the construction contract.

Category V—Resident engineering services during construction

These consist of supplying resident staff on the project to determine if the contractor is carrying out his work in accordance with the contract documents. If required by the Client, resident services shall include the recording of all details of construction for final revisions of the plans or drawings to show the work "as built".

"Engineering Services" as herein described do not include the direction of persons or selection or direction of methods and equipment employed by the Contractor in any phase of the construction or placing in operation of any plant or equipment unless otherwise provided for in the documents of the construction contract.

SECTION II
PAYMENT SCALES

Remuneration for the services in the various categories on Professional Engineering, Geology and Geophysics outlined above may be based on one or more of the following scales :

- Scale 1—per diem rate
- Scale 2—payroll costs
- Scale 3—percentage of cost of work

These scales are explained in detail in the following pages together with recommendations as to which scale is applicable to which category of service.

Scale 1—per diem rate

The per diem rate is intended for a Consultant rendering individual services for which he is particularly qualified and requiring little or no staff assistance. Charges shall be at rates commensurate with his qualifications and/or services given.

The per diem rate is recommended for such assignments as :

- i) Consultations
- ii) Advisory services
- iii) Field work associated with geology, geophysics and petroleum engineering
- iv) Reports establishing data and requirements for design
- v) Research
- vi) Investigations
- vii) Inspection of material and equipment
- viii) Services connected with legal proceedings, etc.

The per diem rates shall be not less than :

1. Professional Engineers who are principals or executives \$ 200.00
2. Senior Professional Engineers and specialists \$ 150.00
3. Payroll costs basis shall be employed for staff time.

A "day" is considered to consist of the hours in a normal working day. However, where the work is performed in other than the normal place of business the working day shall include time spent travelling to and from the place of work.

In addition, the consultant shall be reimbursed for all disbursements and expenses properly incurred in the performance of his services.

Scale 2—Payroll costs

The Payroll Costs scale may be used for staff time for all Categories of work.

The Payroll Costs scale is recommended for staff time particularly for Category II where cost for construction and/or installation does not arise from the consulting services performed, and for Categories III, IV and V where the cost for the construction and/or installation bears little relation to the time expended for consulting services. It is also recommended for redesign or revisions of design arising from reasons beyond the consultant's control or responsibility.

Under this scale the Consultant shall be reimbursed for the services of his staff actually engaged on the project on the basis of payroll costs plus not less than one hundred and fifty percent (150%), except where greater continuity

GENERAL RECOMMENDATIONS AND CONCLUSIONS

The suggested solution was technically and economically sound. Its implementation would allow the salt industry to improve its production and to prosper. Moreover, the price of 1.9 cents per kg for salt purchased by the refinery was favourable to the producer. Salt producers were to have the exclusive right to establish the refinery and the allocation of shares was to be based on the production capacity of each producer. The producers were to be organized in a syndicate or co-operative, which would be in charge of the industrial and commercial operation.

The Government was asked to assist financially in the implementation of the project. The follow-up on the report and the technical implementation of these recommendations was entrusted to the local Industrial Research Institute which was already responsible for the co-ordination of the entire operation.

FINANCING

On the basis of the detailed feasibility report submitted by the consultant, the Ministry of Industry established the following scheme for financing the venture. A shareholding company was formed, with the Government contributing 60 per cent of the capital and the salt producers 40 per cent. The total subscribed capital amounted to about \$ U.S. 328,000. The number of shares each producer had the option to purchase was prorated according to his annual productive capacity. During the following five years, each shareholder could buy additional shares equivalent to 150 per cent of his original holdings. Eventually, the whole company would thus be owned and operated by the salt producers for their own benefit. After five years, stock still held by the Government would be made available to other potential investors.

IMPLEMENTATION OF THE PROJECT

The consultant who had prepared the feasibility study and made the preliminary evaluation was entrusted with the next phase of the project—the preparation of technical specifications and books of tender. The books of tender were distributed to some fifteen suppliers in Europe and the United States, and seven offers varying in their degree of completeness were received. After examining the bids and their compliance with the specifications, the consultant presented his recommendations to the Government, which acted on behalf of the company. Two suppliers were recommended for selection. A representative of the first one flew to the country and a contract for the supply of equipment was placed with him.

Taking into account the process design of the plant and the equipment design of the supplier, the consultant prepared drawings and specifications for the construction and civil engineering works. A local civil engineering contractor was selected on the basis of the book of tender prepared by the consultant.

and magnitude of the project warranted a negotiation but in no case lower than 100%.

“Payroll Costs” means salary plus provision for statutory holidays ; vacations with pay ; sick time allowance (Annual Salary divided by 1700 hours) ; plus unemployment insurance where applicable ; health, medical and liability insurance ; group life insurance ; pension plan contribution ; workmen’s compensation.

“On the project” means the entire assignment for which the consultant has been engaged.

Professional Engineers, who are principals or executives shall charge their own time on the basis of Scale 1 (Per Diem Rate).

In addition the consultant shall be re-imbursed for all disbursements and expenses properly incurred in the performance of his services.

Scale 3—Percentage of cost of work

This scale is recommended for Categories III and IV where a cost for construction and/or installation arises from the engineering services performed. Where Resident Engineering Service is provided in addition to Design and General Engineering Service During Construction it shall be paid for on the basis of payroll cost plus not less than one hundred percent (100%), except where greater continuity and magnitude of the project warranted a negotiation but in no case lower than 75%.

This scale does not cover services performed under Category I or Category II for preliminary investigation to establish requirements for design, nor does it cover items such as the preparation of shop drawings, or “as built” drawings, reinforcing steel schedules and bills of material, professional services in sub-surface investigations and in the inspection and testing of materials and registered land surveys, assistance in the operation of a plant or process or the supplying of linen or transparency reproductions or drawings.

Whenever the Consultant is responsible for and prepares drawings, specifications, change orders, etc., for extras and/or deletions to the contract, he shall be reimbursed for his time on such changes on a payroll costs basis, where such changes are made at the request of the client.

<i>Cost of work (dollars)</i>	<i>Percentage fee</i>	
	<i>Basic</i>	<i>Complex</i>
	On <i>per diem</i> rate or time basis scale 1 or 2 (in %)	
Below \$ 25,000.00 (in US-Dollar)		
25,000— 50,000	7.5	9.0
50,000— 100,000	6.75	8.0
100,000— 200,000	6.0	7.0
200,000— 500,000	5.5	6.25
500,000— 1,000,000	5.0	5.5
1,000,000— 2,000,000	4.9	5.2
2,000,000— 4,000,000	4.7	4.9
4,000,000— 6,000,000	4.5	4.7
6,000,000— 8,000,000	4.3	4.5
8,000,000— 10,000,000	4.1	4.3
Over 10,000,000 not less than	4.0	4.2

except where a fee is negotiated with the express approval of the Association.

Identical units

In cases where a single set of drawings can be used for a multiple number of identical units in connection with projects, the normal fees shall be modified as agreed upon. The reduced fees shall apply only to that part of the project involving the identical units. The reduced fees do not apply in any way to a number of units (i.e. turbine, boilers, machines, etc.) in the same process unit or building.

Complex fees

Complex fees are for services where the engineering required exceeds that normally encountered in the study and design of a project.

SPECIMEN LETTER OF AGREEMENT²⁴

(Date)

Mr. John R. Hughes
President
The Sturdee Corporation
Cleveland, Ohio

Dear Mr. Hughes :

This is to confirm the arrangements for us to make a general examination of your marketing and sales promotion activities as the first step in developing a comprehensive programme for increasing your share of industry volume.

Objective of study

More specifically, the objective of the first phase will be to review all major phases of your marketing, advertising, and sales promotion activities with a view to uncovering specific opportunities for increased volume and developing steps for capitalizing on these opportunities. Some of these steps may be developed to the execution stage; others will require further development and refining during the second phase of the sales improvement programme.

Scope of study

Our general diagnostic examination will cover the following :

1. Appraisal of your present industry position, including elements of strength, weakness, and opportunities for improvement ;
2. Product line—its competitiveness ;
3. Markets—territorial strengths, weaknesses, and improvement opportunities ;
4. Distribution—effectiveness and cost ;
5. Pricing ;

²⁴ Prepared by the Association of Consulting Management Engineers, Inc., New York, October 1966.

6. Sales promotion and advertising—expenditures and their effectiveness;
7. Selling effectiveness—number of salesmen, selection, training, and compensation.

As we get into the study there will undoubtedly be other areas of exploration that will need to be made. However, the above will indicate the comprehensiveness of the study. As we explained, the general examination should produce definite conclusions, some final recommendations and a number of tentative recommendations which would be further explored, refined, and put into effect during the second phase of the sales improvement programme.

The conclusions and recommendations developed during the general examination will be presented chiefly in conferences with your executives—possibly supported by visual material. We would not prepare a comprehensive report, although we should be glad to provide written confirmation of the recommendations.

Study methods

Making the study, we will proceed as follows :

1. Through interviews with your executives in Cleveland and analysis of data reflecting the past results of sales operations, we will gather facts about your products, markets and selling and promotion methods.
2. We will gather information about the industry and the competitive situation from external sources, including contacts we have already established in your industry through other studies.
3. We will obtain facts, opinions, and other information from a field study to be conducted in five sales regions—New England, New York, Middle Atlantic, Great Lakes and Pacific Coast. This field study will include work with your regional managers and some of your most effective salesmen in these regions. We will also conduct individual interviews with distributors and retailers.

Thus an important part of the fact-finding during the first phase will be done in the field. We find that the best answers to marketing problems are found through gathering information as close to the customer as it is economical to do.

4. We will obtain information from your advertising agency about your advertising and sales promotional activities. In this connexion, we will draw on any consumer studies made by your agency or others.
5. Naturally, we will draw on our experience in making similar studies in your industry and others. This will involve conferences within our offices with marketing consultants who have had this experience, but who may not participate directly in your study.

Fees and expenses

We will make the general examination outlined above for a fee of \$
In addition, we are to be reimbursed for travelling and other out-of-pocket expenses. To the extent that it is in your interest to do so, travelling will be from our nearest office.

Personnel and schedules

This study will be under the direction of, one of our partners specializing in marketing, who will participate in the project. He will be

assisted by other marketing consultants in our New York and other offices who will be assigned as they are needed and their schedules permit. We will try to start the general examination within the next few days and to complete it within two months from that time.

We appreciated the opportunity of meeting with so many of your officers. Such a meeting helps to establish a clear understanding of our methods and how we may undertake this assignment. That understanding should, in turn, help to establish the mutual confidence that is essential to the success of any professional undertaking.

We are looking forward to working with you and your associates on what appears to be an interesting assignment.

Respectfully submitted,
(Consultant)

SURVEY OF *PER DIEM* RATES OF MANAGEMENT CONSULTING FIRMS IN THE UNITED STATES²⁵

Billing rates charged for different levels of professional staff in 57 management consulting firms in North America.

<i>Title</i>	<i>Minimum Per diem rate</i>	<i>Maximum Per diem rate</i>	<i>Median (Rounded)</i>	<i>Average (Rounded)</i>
	<i>(in US dollars)</i>			
<i>(a) Per diem rates charged by 10 consulting firms each with 80 or more professional staff men</i>				
Partner or Equivalent (10 firms)	250	650	450	435
Principal Management Consultant (10 firms)	230	500	325	328
Senior Management Consultant (10 firms)	200	350	250	257
Management Consultant (10 firms)	175	275	225	216
Junior Management Consultant (7 firms) . .	133	200	175	171
<i>(b) Per diem rates charged by 22 consulting firms each with from 20 to 79 professional staff men</i>				
Partner or Equivalent (22 firms)	250	600	350	358
Principal Management Consultant (21 firms)	200	360	285	265
Senior Management Consultant (21 firms) .	155	325	225	223
Management Consultant (19 firms)	110	250	200	190
Junior Management Consultant (16 firms) .	80	213	140	144

²⁵ Association of Consulting Management Engineers, Inc. *Survey on Professional Consulting Fee Arrangements*, New York, 1969.

<i>Title</i>	<i>Minimum Per diem rate</i>	<i>Maximum Per diem rate</i>	<i>Median (Rounded)</i>	<i>Average (Rounded)</i>
			<i>(in US dollars)</i>	
<i>(c) Per diem rates charged by 19 consulting firms each with fewer than 20 professional staff men</i>				
Partner or Equivalent (19 firms)	250	550	300	347
Principal Management Consultant (15 firms)	225	375	288	279
Senior Management Consultant (16 firms) .	135	300	230	245
Management Consultant (12 firms)	150	240	200	200
Junior Management Consultant (7 firms) .	125	185	150	152
<i>(d) Per diem rates charged in combined listing of 51 consulting firms in North America</i>				
Partner or Equivalent (51 firms)	250	650	350	369
Principal Management Consultant (46 firms)	200	500	288	289
Senior Management Consultant (47 firms) .	135	350	233	235
Management Consultant (41 firms)	110	275	200	199
Junior Management Consultant (30 firms) .	80	213	150	152
<i>(e) Per diem rates charged in 1966 by 55 consulting firms in North America (for purposes of rough comparison)</i>				
Partner or Equivalent	150	560	275	286
Principal Management Consultant	150	400	225	239
Senior Management Consultant	94	350	200	201
Management Consultant	84	350	175	175
Junior Management Consultant	60	200	125	122
<i>(f) Hourly rates charged by consulting firms</i>				
Partner or Equivalent (7 firms)	31; 35; 40; 45; 50; 50; 70.			
Principal Management Consultant (8 firms) ..	20; 21; 30; 35; 40; 40; 45; 65.			
Senior Management Consultant (8 firms)	17; 19; 20; 30; 35; 40; 40; 55.			
Management Consultant (8 firms)	14; 16; 19; 25; 30; 30; 35; 45.			
Junior Management Consultant (5 firms)	12; 14; 18; 19; 30			
<i>(g) Weekly and monthly rates charged by consulting firms</i>				
Partner or Equivalent	1 weekly at \$1,500; 1 monthly at \$5,000.			
Principal Management Consultant	1 weekly at \$1,200; 1 monthly at \$4,000.			
Senior Management Consultant ..	3 weekly at \$1,000, \$1,000 \$1,250; 1 monthly at \$3,000.			
Management Consultant	2 weekly at \$800, \$1,100; 1 monthly at \$2,500.			
Junior Management Consultant ..	2 weekly at \$500, \$800; 1 monthly at \$1,500.			

RATIO OF *PER DIEM* RATES TO BASE SALARY FOR DIFFERENT
LEVELS OF PROFESSIONAL STAFF MEN IN 49 FIRMS²⁶

Note: Two medians are given for each staff title. Column A lists the median of the ratios indicated by firms which also indicated that they used the ratio method exclusively (28 firms). Column B lists the median of ratios *including* those given by firms which did not use the method exclusively, but felt that the ratios were some proper measure of the relationship between salary and *per diem* rates (21 firms).

<i>Title</i>	<i>A</i>	<i>Medians</i>	<i>B</i>
Partner or Equivalent	2.8 × (24 firms)	2.75 × (45 firms)	
Principal Management Consultant ..	2.8 × (24 firms)	3.0 × (44 firms)	
Senior Management Consultant ...	3.0 × (27 firms)	3.0 × (48 firms)	
Management Consultant	3.0 × (28 firms)	3.0 × (43 firms)	
Junior Management Consultant ...	3.0 × (21 firms)	3.0 × (31 firms)	

²⁶ *Ibid.*

Annex 4

SPECIMEN CODES OF ETHICS

EXCERPT FROM THE STATUTES FOR MEMBERS OF THE EUROPEAN FEDERATION OF MANAGEMENT CONSULTANT ASSOCIATIONS²⁷

It shall be regarded as unprofessional conduct for members :

- (a) To advertise consultancy services in a blatant or commercial manner ;
- (b) To accept, or permit their staff to accept, any trade commission, discount, or consideration of any sort, in connexion with the supply of goods or services to clients ;
- (c) To have any interest in firms supplying goods or services to their clients, to be controlled directly or indirectly by a supplier of such goods, or to fail to make known any kind of interest which may affect their own services ;
- (d) To calculate their remuneration on any basis other than a fixed fee agreed in advance (which may be on a time basis) ;
- (e) To disclose, or permit to be disclosed, confidential information regarding their clients' business ;
- (f) To pay or accept remuneration for the introduction of clients, save in accordance with recognized and generally accepted professional practice in the country concerned ;
- (g) To do anything likely to lower the status of management consultancy as a profession.

CODE OF ETHICS, AMERICAN INSTITUTE OF CONSULTING ENGINEERS²⁸

It shall be considered unprofessional and inconsistent with honourable and dignified conduct for any member of the American Institute of Consulting Engineers :

1. To act for his client in engineering matters otherwise than as a faithful agent or trustee ;

²⁷ Fédération européenne des associations de conseils en organisation, "Excerpt from the statutes for members of the European Federation of Management Consultant Associations", in *To Work with Management Consultants*, Swedish Association of Management Consultants, Stockholm, 1963, p. 12.

²⁸ The Code of Ethics, approved by the Council of the Institute on 17 June 1958, and amended by the Council on 25 November 1958, was adopted by the membership of the Institute at its Annual Meeting on 19 January 1959.



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Work on the site started two months later, and the buildings were sufficiently advanced to make it possible to erect the plant when the equipment arrived. All equipment requirements were taken into account in the consultant's detailed drawings, which were supplied to the civil engineering contractor as the work progressed. The equipment was supplied in three consecutive shipments within a period of eight months. Four months after the order was placed, the erection was begun under the supervision of an engineer and a builder furnished by the supplier. The consultant and the labour force provided by the client were present at the operation.

Meanwhile, a 200-ton pile of salt was prepared for trial tests and commissioning. The performance was in accordance with the guarantees of quantity and quality of salt stipulated in the equipment contract, and the consumption of utilities was found to be within the limits specified. A document summarizing the proceedings of the commissioning operation was prepared by the consultant and handed to the Government. 80 per cent of the costs were immediately paid and of the remaining 20 per cent, 10 per cent were to be paid at the end of the first year and another 10 per cent at the end of the second. A maintenance schedule and spare parts lists were also provided by the supplier at the request of the consulting engineer.

In addition, a simple training programme for all levels of personnel was established jointly by the original consultant and the Research Institute which had supervised the entire operation.

Case study No. 5: **STUDY OF THE PRODUCTION AND MARKETING
ACTIVITIES IN A MANUFACTURING COMPANY**

The Managing Director of a company which produces for both domestic and export markets explained to a local management consultant that company operations were being jeopardized by the mismanagement of its workshops and the lack of a system to keep management informed of client complaints, especially from abroad, about its products. The Managing Director was so concerned about the matter that he held daily meetings to discuss reports on delivery delays and customers complaints.

The preliminary interviews between the consultant and the senior members of the client organization did not enable the management to determine whether a system for registering complaints and a more efficient production and maintenance system would eliminate the difficulties and help the firm increase its sales. In view of the complexity and scope of operations and the paucity of reliable data the company could provide, the client allowed the consultant to make a preliminary survey to discover the areas in which problems arose and to classify them according to urgency and sequence. Several functional areas were subsequently explored: production, marketing, finance and organization.

A productivity study of the manufacturing operation, including the review of plant layout, the efficient use of labour and materials with reference to quality control, safety measures and the like, indicated that as far as production went, the company was efficient and that production costs were in line.

With respect to marketing, the consultants found that delivery delays compared favourably with the best standards set by international firms of the same kind. The percentage of complaints about defective products was not particularly large. However, the company lacked a marketing strategy to define appropriate product specifications, product mix, advertising policy and information on consumer preferences. The company also tried to compete in markets where it was at a disadvantage, while it neglected those where it had a competitive advantage.

As regards financing, the company did not have the foreign currency necessary to advertise and support its overseas branches. Management lacked a clear idea of how to raise funds and there was no established debt policy.

In the general organization and management of the company, professional conflicts and the absence of a career planning system hampered the efficiency of overseas branch managers and deprived the company of the essential succession of experienced sales personnel.

When these findings were discussed with the company, it was agreed that attention should be given in the first place to the development of a proper financial policy in order to have the necessary funds for competitive overseas operations. At the same time it was agreed to establish a market research programme with a view to developing a marketing and advertising strategy. As for the organization and personnel policy of the company, it was considered to be of secondary importance and was reviewed later.

The client firm set up committees to study these problems and to outline programmes with the help of the consulting firm. When these studies were completed to the satisfaction of both the client and the consultant, the latter was retained to assist management in the implementation of the proposed programmes.

Case study No. 6: **REDUCTION OF UNIT PRODUCTION COSTS**

A large manufacturing company enjoyed nationwide distribution of its products in a developed country. The firm employed 190 people and its workers had long been members of a strong national union. The relations between union and management had always been excellent. The management attributed this to the union's acceptance of methods that increased productivity.

A few years ago, the company's management was alarmed when it found that production costs were almost the same, or possibly greater, than those of competitive companies in the country. In particular, the management was of the opinion that the production methods of the entire industry were antiquated and that many improvements could be introduced if the problems were approached properly. It therefore decided to submit the following two questions to a consulting firm: What is the maximum obtainable output per worker? And how can the company achieve that maximum?

After thorough investigation, the management held preliminary discussions with representatives of the consulting firm. As a result of these discussions, the management became convinced that, in spite of the fact that the company used generally accepted production methods, unit production costs could never-

theless be reduced considerably. It therefore asked the consultant to study company operations and recommend changes in production methods in order to reduce manufacturing costs.

Before the consultants were hired, all the workers were assured that no one would lose his job as a result of changes they might propose and that piece rates would remain the same. Furthermore, all the members of management and the supervisory force were convinced that the consulting engagement would be beneficial to the firm. Management felt that the attitude of the employees towards the recommended changes was as important as the recommendations themselves. It also knew that, without the complete co-operation of the supervisory personnel, the consultant's efforts would be doomed from the start.

Two months later, the consultants proposed changes in method to speed up production substantially. The management adopted these recommendations which, in effect, reduced the "off-the-job" time of production workers. The result was astounding: the production per eight-hour day increased by 100 per cent, and thus the flow time and in-process inventory was cut in half.

On the other hand, economies resulting from the plan appeared mainly in the reduction of direct overhead cost ratios. Since the production workers were paid on a piece rate scale, the direct savings resulting from the consultant's recommendations went to them in the form of much higher wages. Company benefits from the reduction in overhead costs were substantial. In addition, the reduction of the time necessary to fill orders gave greater flexibility to the company's operations and increased their competitive position.

Annex 2

THE SELECTION OF CONSULTANTS

SAMPLE EXTRACTS OF THE REGULATIONS GOVERNING THE ACTIVITIES OF FOREIGN CONSULTANTS

REGULATIONS GOVERNING THE ACTIVITIES OF FOREIGN ENGINEERING CONSULTANTS IN SOME MIDDLE EASTERN COUNTRIES¹⁹

Iran

1. Engineers' qualifications must be certified by the High Education Council of Iran.
2. All engineers are required to obtain a Ministry of Labour work permit, issued by a consular agency before entering the country.
3. A consulting engineering firm must have a local representative not necessarily Iranian.
4. No requirements for local partners in the firm.
5. Contracts are usually awarded on the basis of closed bids.

Iraq

1. Licences are required and can be obtained from the Engineers Association in Baghdad, provided the engineer is a graduate of a recognized college.
2. Non-Iraqi must obtain a work permit from the Directorate General of Labour.
3. No local representative is required.
4. Engineering contracts are normally negotiated.

Israel

1. Engineers must be members of a recognized professional body or graduates of recognized institutions.
2. No licence is required.
3. Registration with the Registrar of Business Names and the Ministry of Justice by furnishing a statement containing name, nature and place of business, nationality and residence.
4. No requirements for local representation or participation.
5. Contracts are generally negotiated but sometimes let on a bid basis.

Lebanon

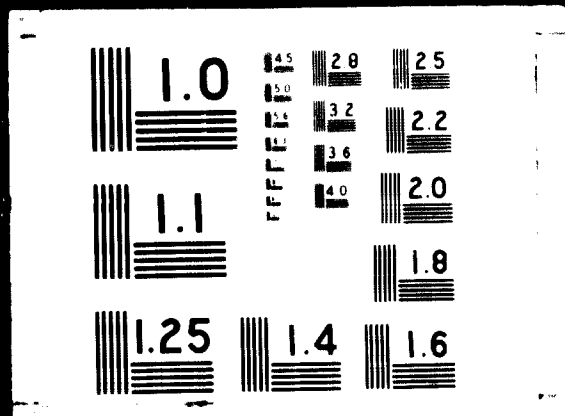
1. Engineering consulting firms cannot operate without local representative.

¹⁹ K. L. Koller, "Rules for engineering consultants vary among Near-Eastern countries," *International Commerce*, Washington, D. C., 1 Feb. 1965, p. 33.

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2. To accept any remuneration other than his agreed charges for services rendered his clients ;
3. To pay commissions or make donations to other than regular employees in negotiating for engineering work ;
4. To compete with a fellow engineer for employment on the basis of fee, or to invite another engineer to do so ;
5. To attempt to supplant another engineer knowing that definite steps have been taken towards his engagement ;
6. To engage to review the work of another engineer for the same client, if such engineer is still employed, except with his consent ;
7. To attempt to injure the reputation, prospects, or business, of another engineer ;
8. To be associated in the conduct of engineering work with others who do not conform to the basic principles of this code ;
9. To advertise or make public statements, in a self-laudatory manner ;
10. To engage in any practice which will tend to bring discredit on the honour or dignity of the engineering profession.

STANDARDS OF PROFESSIONAL CONDUCT, AMERICAN INSTITUTE OF CONSULTING ENGINEERS²⁹

1. A member shall abide by the Code of Ethics of the American Institute of Consulting Engineers.
2. A member who has proof that another member has violated the Code of Ethics will bring the matter to the attention of the Council of the Institute.
3. A member shall inform his clients of business connexions, interests or circumstances which might influence his judgement or the quality of his services.
4. A member shall promptly disclose to his clients any interest in a business which may compete with or affect the business of his client. He will not allow such interest to affect his decisions.
5. A member shall not disclose information concerning the business affairs or technical processes of clients without their consent.
6. A member shall not divulge any findings of studies or actions of an engineering commission of which he is a member, without the official permission of the commission.
7. A member shall not make use of information or discoveries, or the results therefrom, obtained while in the service of a client, in any manner adverse to the interests of the client.
8. A member shall engage or advise his client to engage, and he shall co-operate with, experts and specialists whenever the client's interests would be best served by such services.
9. A member who serves on a public or quasi-public board which is required to pass upon plans, specifications, and designs of engineering works shall debar himself from accepting any engagement involving matters that may come before him in his public capacity.

²⁹ The Standards of Professional Conduct, approved by the Council of the Institute on 17 June 1958, and amended by the Council on 25 November 1958, were adopted by the membership of the Institute at its Annual Meeting on 19 January 1959.

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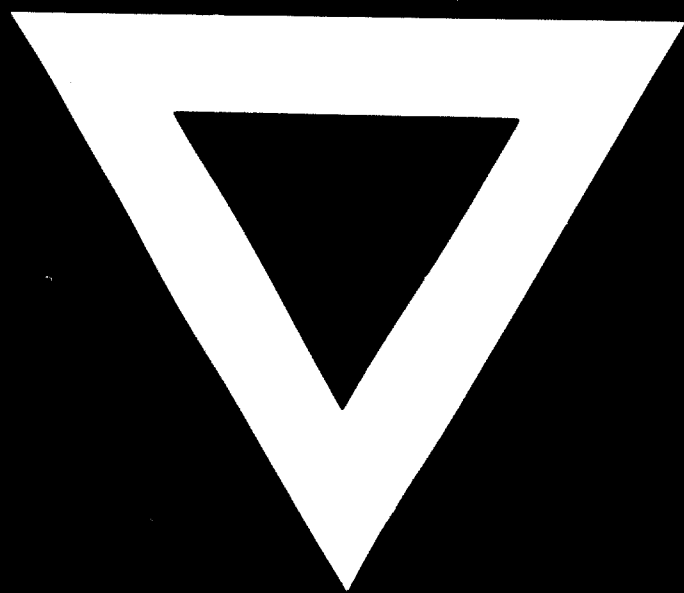
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10. A member shall not accept compensation, financial or otherwise, from more than one interested party for the same service, or for services pertaining to the same work, without the consent of all interested parties.
11. A member shall not accept for himself commissions or allowances from contractors or other parties dealing with his client in connexion with work for which he is responsible.
12. A member shall not accept for himself any trade commissions, discounts or allowances in connexion with a professional engagement.
13. A member shall not accept for himself, unless authorized by the client, any royalty, gratuity or commission on any patented or protected article or process used on work upon which he is retained.
14. A member shall not compete with another engineer by reducing his usual charges or attempting to underbid, after being informed of the charges named by his competitor.
15. A member will not use the advantage of a salaried position to compete unfairly with other engineers.
16. A member will not knowingly submit a proposal for rendering engineering services on a competitive price basis.
17. A member will not invite proposals for the performance of engineering services on a competitive price basis.
18. A member will not attempt to supplant another engineer before that engineer's services have been terminated.
19. A member will, as soon as possible, sever his relations with an engineering organization whose representatives, whether or not under his direct control, refuse to conduct themselves and the business of the organization in accord with the Code of Ethics of the American Institute of Consulting Engineers.
20. A member will not advertise or make public statements or releases on his professional practice, qualifications, or achievements, in misleading, self-laudatory, or undignified language or manner.
21. A member will decline to give a bond for the faithful performance of engineering services, unless required by foreign practice.
22. A member will not enter competitions for designs for a specific project, unless provision is made for reasonable compensation for all designs submitted.
23. A member will warn his client of the consequences to be expected from any deviations from his engineering recommendations proposed by others.
24. A member will not issue comments, criticisms, or arguments on matters connected with public policy that are inspired or paid for by private interests, unless he indicates on whose behalf he is acting.

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