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A FRAMEWORK FOR THE PROMOTION OF CONSTRUCTION INDUSTRIES
IN THE DEVELOPING COUNTRIES

The study was prepared for the Bank by a team of consultants, John C. de Wilde & Associates, on the basis of visits to a number of developing countries to explore ways in which the Bank can assist the development of a domestic contracting industry. The report suggests a number of approaches for tackling the economic and institutional problems facing the growth of this industry in developing countries.

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ANNEX

Development of the Contractor in Terms of his Qualificaitons, Capability,
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A FRAMEWORK FOR THE PROMOTION OF CONSTRUCTION
INDUSTRIES IN THE DEVELOPING COUNTRIES

SUMMARY AND CONCLUSIONS

i. The Mission visited four countries - Korea, Iran, Ethiopia and Kenya. In the first three it sought to diagnose the problems encountered in the evolution of domestic construction industries and the various factors which had contributed or inhibited development of these industries. In the fourth it examined a special government program for the promotion of indigenous contractors. On the basis of these studies and drawing also on the previous experience of its members, the Mission has devised a set of guidelines which might be applied by the Bank and relevant governments in working out programs for developing domestic construction industries in particular countries. In this context it defined a "domestic construction industry" as one comprising enterprises owned in whole or in major part by residents of local nationality or citizenship.

ii. The Mission did not consider itself competent to determine what priority should be accorded to the development of domestic construction industries. Since 50 to 60% of gross fixed capital investment in developing countries usually goes into construction, the efficiency with which construction is carried out is unquestionably important. However, this is not necessarily relevant to a determination of the proportion in which domestic and foreign contractors should meet the demand for construction. Most countries have developed, or find it necessary to develop, a domestic industry capable of doing most building work because foreign contractors are usually available only for large building projects. Frequently, however, it may not be economic to develop a domestic capability for a broad range of civil works. There may not be enough demand for civil works construction to permit sufficient work for domestic enterprises. Even if existing or prospective demand is sufficient, the timing of efforts to promote the domestic capacity to meet it may well be critical. When there is little indigenous business enterprise in general and the level of educational and technical skills is low, the costs of special programs to develop civil works contractors are likely to be out of proportion to the possible long-term benefits that might conceivably accrue.

Initial Requirements

iii. The first step in determining the justification, scope and nature of any program to develop the domestic construction capacity in a particular country should be to assess the current and prospective demand for various types of construction work and at the same time to appraise the actual or potential capacity of domestic enterprises to meet this demand. The state of development and the particular problems of building the civil works contractors must be carefully analyzed. In Chapter II the Mission has indicated what should be done in these respects.

Once this initial survey and analysis has been completed it will be possible to determine the size and structure of the domestic construction industry that might be developed and the progressive steps by which this might be accomplished.

iv. If a promotion program is deemed feasible, the next step is to make sure that the government is prepared to make the construction industry the object of coherent and conscious planning and development. In the past the measures which governments have taken to promote this industry have usually been ad hoc in character. Government economic planning agencies have paid little or no attention to the implications of general development plans for the construction industry. The possibilities of planning public construction industry have hardly been examined. Manpower planning and education have in many respects failed to cater effectively for the requirements of the construction industry, so that the latter has usually had to train its own skilled labor on the job and has often suffered from critical manpower shortages, particularly at the subprofessional level. In general governments have provided no special facilities for financing construction enterprises and have frequently aggravated the financing problems of contractors by delays in payment. The conditions of contract, specifications and construction standards which have usually been modeled on those in advanced countries have not been well adapted to the requirements of developing countries. The Mission noted that the provisions of construction contracts governing settlement disputes and responsibility for extra or additional costs arising out of variations and unanticipated conditions were often excessively weighted in favor of the public employer and tended to force new and relatively inexperienced contractors to assume risks which they were really incapable of bearing. While literal compliance with such contract stipulations has often been waived, the amount of discretion that can be exercised in this respect by government officials has exposed the construction industry to arbitrary and capricious action and provided ample opportunities for corruption.

The Content of Development Programs

v. The third step is to determine the content of an appropriate development program. The Mission has worked out a method of approaching this problem by setting forth all the component elements which it believes should be considered and suggesting how each of these might be handled. Its recommendations have been devised with particular reference to:

- (a) the special risks and features of the construction industry; and
- (b) the need to adapt any program to the changing problems and requirements of domestic contractors as they progress through successive development phases to a final stage at which their efficiency approximates that of foreign contractors.

vi. The construction industry is characterized by certain special features which enhance the risks and complicate the management problems of contractors. The demand for construction is subject to greater discontinuities and fluctuations than the demand for manufactured products,

especially consumer goods. Since such demand in developing countries is largely determined by public sector outlays, it is usually dependent on fluctuations in government financial resources, changes in the composition of public investment and delays in public project preparation. Construction projects are nearly all custom-built to the requirements of the user and usually at prices agreed at the time of the contract. The fact that construction takes place at many sites increases possible variations in conditions and costs and complicates the managerial task of mobilizing and supervising men, materials and equipment. Construction is subject to delays and damage owing to exposure to the elements. Changes in the cost of labor and materials that may intervene before construction is completed, are often considerable and difficult to anticipate. Under all these conditions, the contractor runs not only the risk of periodic unemployment but also the risk arising out of his difficulty in making cost estimates that will adequately safeguard him against a broad range of adverse contingencies. The Mission has therefore addressed itself particularly to ways and means of mitigating these risks for the neophyte or inexperienced contractor and of bringing about a more equitable apportionment of risks and responsibilities between the two parties to the construction contract, namely the employer and the contractor.

vii. Recognizing that the problems and requirements of a domestic construction industry will change as it evolves, the Mission has related its recommendations on the content of a promotional program to the successive phases of development which contractors in the various branches of construction might be expected to experience. A time frame comprising an "early," "intermediate" and "late" phase of development has accordingly been envisaged, although these are assumed to merge gradually into each other without clear-cut lines of demarcation. The essential characteristics of each of these phases are given in paragraphs 56-63 of Chapter I. Separate time frames may be appropriate for the development of building contractors on the one hand, the civil works contractors on the other hand.

viii. The various measures which we believe should be adopted in each phase of our time frame are set forth succinctly and in tabular form in Annex I of this report, and the reader is strongly advised to give careful consideration to this Annex before pursuing the whole report. It shows:

- (a) the criteria recommended for qualifying contractors for participation in a development program and for eliminating those failing to perform;
- (b) the methods proposed for facilitating procurement of work for developing contractors and for protecting such contractors against some of the risks of competition;
- (c) the kinds of information that the government might provide contractors to assist them in costing and carrying out their construction work;
- (d) the changes in contract terms that would bring about a more appropriate apportionment of risks between government and the contractor;
- (e) the nature and focus of technical assistance and training that might be made available to developing contractors; and
- (f) the special financing facilities that could usefully be developed for such contractors.

Qualification of Contractors for Development

ix. A central feature of our proposals is that existing and aspiring contractors should be carefully screened or qualified for participation in a development program. A careful record of their subsequent performance should then be kept so that those failing to demonstrate their capacity can be dropped. In Kenya, the program which the government had launched to promote African contractors has failed in part because it did not concentrate on entrepreneurs with a real capacity. Elsewhere the Mission found that government systems for classifying contractors in terms of their eligibility to carry out various types of construction work were seldom strict enough, and tended to result in an "overcrowding" of the industry in relation to demand. The Mission has suggested that the task of qualifying contractors and their continuing evaluation be entrusted to an autonomous public contractor development and agency which would be as immune as possible to political pressure and which would also be responsible for helping the contractors in the program to procure work, provide them with training and advice and recommend them for special financial assistance. The criteria which this agency might apply in qualifying and screening contractors are set forth in paragraphs 16-18 of Chapter II.

Procurement of Construction Work

x. Work experience and some continuity of work are essential to the sound development of a domestic construction industry. In Korea and Iran, where the indigenous construction industry has made rather rapid progress, the Mission found that the government had disposed of resources which enabled them to reserve a substantial part of construction to domestic enterprises. Under these conditions construction firms had been enabled to gain a volume and range of work experience which would have been impossible to achieve if they had been exposed to competition from more experienced foreign firms at all times. Subsequently, the experience thus gained enabled them increasingly to meet competition from foreign enterprises. At the same time Korean and Iranian construction firms both benefited from a rapid and continuing expansion of the construction market which provided a continuity of work that permitted many of them to develop their resources and their capacity gradually to cope with the risks of competition (see paragraphs 31-32, Chapter I).

xi. The various measures which might be taken to provide a larger and continuing volume of work to developing construction enterprises are set forth in the paragraphs below.

Reservation of Construction Work

xii. One of the Mission's most important recommendations is that in the early phase of development construction work be reserved to the developing group of contractors and awarded among them without competition but within certain price ceilings set by the government (see Section B, Chapter IV).

The Mission does consider that contractors should ultimately be expected to operate under competitive conditions, and that competition among experienced and reasonably well-financed contractors will generally tend to lower construction costs. It believes, however, that competition will not yield such cost-benefits in the early phase of development and that competition is incompatible with the overriding need to give neophyte and relatively inexperienced contractors the continuity of work that will enable them to acquire experience and build up the personnel and financial resources which they will eventually need if they are to survive the risks of competition. Such contractors will for the most part be unable to prepare sound cost estimates. For them the competitive method of awarding contracts is largely a lottery. If one of them is able to prepare a correct tender and is prudent enough to raise his bid to take into account all the risks to which he will be exposed, others will not have the same capacity and may therefore bid well below probable costs. If the successful bidder runs into insuperable difficulties because he has been unable to anticipate his costs correctly or encounters unexpected problems at the site, he will be unable to complete the job and his performance guarantees will probably prove inadequate to permit the completion of the work by another contractor at the same cost. Under these conditions, the contractor will either be "bailed out" through price adjustments, or he may fail simply because he has been unable to cover his costs. There may well be successive series of "fly-by-night" contractors who will have a high rate of attrition but who will at the same time prevent the prudent, cost-conscious contractor from thriving and building up his business. The economy will in the last analysis have to pay the cost of a high rate of failures or for the inevitable periods of idleness from which surviving contractors will suffer. If a civil works contractor invests in equipment for the purpose of carrying out a single contract, but then cannot get another job because the market affords comparatively few work opportunities or because another either intentionally or unintentionally bids below costs, it will be not only the contractor but also the economy that will have to bear the cost of idle equipment. Competition is likely to encourage overinvestment in equipment which a developing country will find difficult to support. The civil works contractor who has substantial fixed costs as the result of investment in equipment will quickly go under unless he is ensured the continuity of work that will enable him to utilize that equipment more or less continuously over its life. However, continuity of work is important to the construction industry and to the economy of a developing country, not simply because it promotes fuller utilization of scarce capital assets. The development of effective enterprises where managers and personnel have become an efficient "production team" by working together over a considerable period is just as important. And enterprises in this sense cannot be created unless there is sufficient continuity of work that will ensure the acquisition of collective experience and the income essential for maintaining and expanding this production team.

Project Design and Specifications

xiii. The possibilities of designing construction projects to take into account the capacity of indigenous construction enterprises should be

carefully explored. The design should, of course, always be consistent with the realization of the basic purpose that the project must serve, but within this limitation there are often alternative designs, some of which may be within, and others outside of, the capacity of the domestic enterprises. There is often a tendency in developing countries to over-design a project in relation to its purpose and desirable life, and this tendency may not only result in unnecessary increases in cost, but also in specifications with which domestic construction firms cannot cope. In this connection, the Mission would stress the importance of value engineering in determining the most economical project design and in making a comparative assessment of the marginal costs and benefits of insisting on higher standards of construction and perfection. Where possible, design should take into account the technological level of existing contractors. Both technology and the related design concepts should evolve with the growing capabilities of domestic contractors. Initially, efforts may well have to concentrate on the more efficient application of tools, materials and methods which such contractors are already using, but as these improvements yield progressively diminishing returns, new technologies, involving more advanced design concepts, management and construction techniques, can and should be progressively introduced (see paragraphs 1-11, Chapter III).

Division and Subdivision of Construction Work

xiv. In Annex I and Section A of Chapter IV the Mission has examined, though not exhaustively, to what extent public construction programs and projects might be divided and subdivided, both horizontally and vertically, and phased over time in order to increase the possibilities of participation by domestic contractors and subcontractors. The Mission has made a number of suggestions on methods of doing this and has drawn up, as an illustration, a model of a five-year road construction program which could be used as a vehicle for the development of domestic road contractors. The Mission realizes, of course, that considerations of cost and feasibility impose certain constraints on the extent to which construction programs and projects can be divided and phased in practice.

Phasing of Government Construction Demand

xv. On a continuing basis the government should consider what can be done to phase its construction work in such a way as to provide more continuous employment for the construction industry. We do not suggest, of course, that the phasing of such work should be dictated by the requirements of the industry, but simply that the latter's needs be considered as one of the factors in determining when projects are to be started and completed. The economic need of a project, and its relationship to other projects that may contribute to the satisfaction of this need, will generally be the principal, if not the sole factor in deciding the construction schedule. However, the timing of many projects in developing countries is often determined not so much by economic requirements as by purely adventitious circumstances. The Mission is persuaded that the scheduling of development projects can often be changed in the interest

of providing more stable employment to the construction industry without adversely affecting general economic development (see paragraphs 11-14, Chapter II).

Protection Against Risks

xvi. There are two types of risks which should be considered. One is the risk of competition. We have already suggested that in the early phase of development competition be ruled out for the purpose of giving the neophyte or inexperienced contractor adequate work experience and employment. However, we propose that he be subjected to progressively more competition in the succeeding phases, subject only to protection against the risks of excessive underbidding in the intermediate phase. The justification for our position is given in paragraphs 20-22 of Chapter IV.

xvii. The other category of risks includes all those which can in principle be assumed in varying proportions by either the contractor or employer. These are the risks arising out of errors in bidding, interruption of, and damage to, work in progress, unexpected subsurface conditions, changes in design, failure to verify designs, escalation in costs of materials and equipment, etc. The Mission found that contractual arrangements governing the responsibility for extra costs (or penalties) arising out of these risks were often unduly weighted in favor of the employer. The Mission feels strongly that any development program should provide for an appropriate revision of these arrangements along the lines indicated in Chapter V and summarized in Annex I. In general the Mission believes that the new and developing contractor will not have the resources and experience that will enable him to bear much risk. It is therefore considered appropriate to keep both his responsibilities and his risks at a minimum during the development phase, and to provide that he should gradually assume a greater degree of risk as he gains in experience and resources.

Supervision and Acceptance of Construction Projects

xviii. The government as employer must, of course, supervise the work of the contractor and make sure that the work is properly completed. However, the way in which this responsibility is carried out often has a critical bearing on the success of contractors. The government inspector is frequently the undisputed "king" of the construction site. His actions can be arbitrary and capricious. In many cases he has little appreciation of the practical problems of the contractor and insists on literal and detailed compliance with all specifications without regard to their relevance to the achievement of the basic purpose the project must serve. The Mission therefore believes that a development program may well have to provide for some retraining and reorientation of government supervisory staff and for a careful consideration of the standards which the government as employer should apply in supervising and accepting

construction projects. A government may excessively discourage the development of indigenous construction enterprises by insisting on too exacting standards. In the initial development phase it should generally be content with a project that will function satisfactorily even though it may be crudely executed by western standards. The quality of workmanship, insofar as it affects the anticipated maintenance and replacement outlays during the life of the project, can obviously not be ignored but will still be less vital. Appearance, in terms of aesthetics and qualities of finish, will usually be of only tertiary importance during the early phase. However, as contractors move into the intermediate and late phase of development, they can and should be expected to conform to progressively higher standards of workmanship and development.

Direct Assistance to Developing Contractors

xix. The Mission recommends that special assistance be extended to developing contractors in various forms as outlined below.

Information and Guidance on Contracts

xx. The Government in its capacity as employer should help the neophyte and inexperienced contractor by providing him with certain types of information and guidance. The employer should furnish the contractor at all times with detailed project designs, drawings, specifications and bills of quantities. Specifications should be simplified and standardized as far as possible and be given in the form of "method" specifications which will give the contractor exact instruction how to achieve the standards or "end-results" desired by the employer. The Mission believes that contractors cannot generally be expected to conform to "end-result" specifications until the late phase of development. The detailed drawings that should be furnished to the contractor should cover during the early development phase also the temporary works, such as shuttering, bracing, coffer dams and the like which contractors must construct to carry out the project. The government's own cost estimates should be given to the contractor to help him control his costs during the early phase; and at least partial cost estimates, such as those relating to major or difficult items of work might usefully be given to the contractor during the intermediate phase so as to help him in preparing his tender. The employer should also provide much of the field engineering, such as the surveying for horizontal and vertical controls and the determination of working points. The contractor should, however, be expected to develop the necessary capacity for setting out the work some time during the intermediate phase. Finally, the government should provide the developing contractor with work plans and schedules that would assist him in planning his work (see paragraphs 14-21, Chapter III and paragraphs 1-6, Chapter V).

Technical Assistance and Training

xxi. We envisage that the proposed contract development agency would have a staff, both foreign and indigenous, with practical experience of

construction who can advise developing contractors out in the field on their technical and management problems and also organize brief training seminars for contractors and their personnel. Annex I summarizes the suggested nature and scope of this type of assistance through the successive development phases, and Section E of Chapter VI sets forth the Mission's proposals in greater detail. Kenya was the only country in which the Mission found a program of technical assistance and training for indigenous contractors in operation. In practice, this program has had certain deficiencies (see paragraph 46, Chapter I), which, however, are not necessarily insuperable. Unquestionably, it is difficult to find experienced staff to provide such assistance. Paragraphs 36-39 of Chapter VI deal with this problem.

Financial Facilities

xxii. The Mission found that inadequate access to financing - for the provision of bid, performance and maintenance bonds, and of working and equipment capital - often hampers the development of contractors who otherwise appear to have the potential or actual qualifications for success. Contractors who have had the advantage of previous success in some other business or have inherited wealth are not, of course, seriously handicapped, but by no means all promising contractors fall in this category. Normal financing institutions are generally reluctant to finance construction enterprises owing to the considerable risks involved, and are particularly wary about financing contractors who have not yet moved themselves and who can put up only a modest amount of capital of their own. The Mission has worked out a number of recommendations on contractor-financing, which are summarized in Annex I and elaborated in Chapter VII. We have suggested that financing in the early development phase can only be provided from public funds administered under proper safeguards, but that this responsibility should be shifted as soon as possible to normal financial institutions with the proviso that the latter be insured by a public fund against part of the risks involved. The Mission also examined briefly fiscal provisions governing the construction industry and has suggested that, if the promotion of this industry is considered really important, it might be appropriate to accord new construction enterprises temporary profits, tax exemptions or concessions as is often done in the case of new manufacturing ventures.

Final Remarks: Suggestions for Pilot Programs

xxiii. The Mission has made its recommendations on the various factors or elements that may be relevant to the development of domestic construction industries in the full realization that: (a) alternative methods of dealing with the development problems it has emphasized may well be advanced and tested; (b) development programs worked out for particular countries will presumably not always need to be as comprehensive as the Mission has indicated; and (c) in view of the fact that there is little or no experience with programs to develop domestic construction enterprises, it is important to test the feasibility of any set of measures first in a

limited number of pilot programs. The Mission has also listed in paragraph 2 of Chapter VIII, a number of topics relevant to the development of construction industries that might be the subject of further examination and research.

xxiv. In paragraphs 11-20 of Chapter VIII the Mission has indicated how and under what conditions a small number of pilot programs might be framed and carried out. Such programs should be undertaken only in countries where the government evinces a real interest in the promotion of a construction industry and understands what is involved and where the demand for construction is sufficiently large and dynamic to offer significant opportunities for the development of a reasonably diversified construction industry. In addition, it would probably be instructive to select one or two countries where the domestic construction industry can be said to be already in the intermediate phase of development as well as a few where the industry is only in its early phase.

xxv. Such pilot programs should preferably be carried out in partnership between the Bank and the government concerned. Each would have to assume certain responsibilities and obligations as outlined in Chapter VIII of this report. The Bank should be fully aware that its responsibilities for the effective planning and execution of such programs would be considerable. It would have to make sure that the agencies charged with the financing of contractors and with contractor development are given the authority and independence that would enable them to operate in accordance with objective criteria. It should be prepared to assist actively in the task of staffing the contractor development agency on whose personnel the success of a development program will significantly depend. If the Mission's recommendations regarding contract reservation and contract awarding during the early development phase are adopted, this would entail, at least in principle, some modification of its insistence on competitive bidding. However, this modification may not be very significant in practice, since it would be needed only to the extent that an adequate volume of work would not otherwise be available and only a few types of construction work financed by the Bank Group, such as school construction, small and simple road contracts and other minor civil works of this nature, are likely to fall within the capacity of contractors who are in the early stage of development.

xxvi. In view of the novel and experimental character of such pilot programs, it is important that the commitments by the Bank and the government involved should not exceed five years. Such a period should be long enough to provide a more adequate basis for appraising both the costs and benefits of efforts to promote the construction industry. It should be sufficient, too, for testing the effectiveness of various elements in the program. The Bank and the government concerned will, of course, need to carry out periodic evaluations of the results achieved and to consider possible modifications in the light of their findings.

A FRAMEWORK FOR THE PROMOTION OF CONSTRUCTION
INDUSTRIES IN THE DEVELOPING COUNTRIES

CHAPTER I

TERMS OF REFERENCE AND THE ANALYTICAL APPROACH

A. Introduction

The Mission's Terms of Reference

1. The Mission was given the mandate to study the construction industries in three countries - Korea, Iran and Ethiopia - to which a fourth, Kenya, was later added for certain purposes. This study was to facilitate a diagnosis of the problems encountered in the development of domestic construction industries and of the various factors which over time had contributed to, or inhibited, the development of such industries. On the basis of these studies, the Mission was to devise as far as possible a set of guidelines providing a coherent framework within which the task of developing the construction industry in an individual country might be approached. In addition, it was to recommend what further research work might be undertaken in this field in the form of additional country studies, examination of particular problems, or pilot development programs.

Definitions

Scope of the Construction Industry

2. It is important at the outset to define certain terms as well as the scope of our work. First of all, what is the "construction industry" and to what extent have we concerned ourselves with the whole of the construction process? The construction industry can be defined broadly to include maintenance, as well as new works. While maintenance is unquestionably important and can, in particular, provide learning experience for all contractors in the early stages of their development, the Mission has almost entirely focused on "new works." Even with respect to the latter, however, the industry can be defined to embrace the whole of the construction process from the design of the project to its final acceptance by the client, or more narrowly to include only enterprises engaged in the procurement and execution of construction contracts. For the purpose of this report we have defined the construction industry as the collection of enterprises, private and public, which are engaged in actual construction work as contractors or subcontractors.

3. At the same time, however, we have constantly kept in mind that construction is a process involving many parties whose actions must be properly coordinated. First, there is the "user" who must determine, in a design brief, the purpose which the project is to serve and the general requirements which it is to meet. Second, is the "employer" or

"client" of the contractor. Frequently he is also the "user." He is generally responsible for designing the project, preparing the specifications and drawings, estimating the cost of construction, drawing up the tender documents, concluding the necessary contracts for construction, supervising the work as it progresses, making the necessary payments to the contractor, and, finally, for deciding on the provisional and final acceptance of the construction work. He commands a design team comprising engineers, architects, quantity surveyors, topographic surveyors and draftsmen; and he has a corps of inspectors to check on the progress and quality of the construction work, to measure the work done and to certify it for payment. For the preparation of designs, specifications and cost estimates, as well as for the supervision of the construction contract, the employer may rely not only on his own staff, but on the services of consulting engineers and architects. Finally, there are the contractors who must tender or negotiate for the work and carry it out, and the subcontractors who are usually selected by the prime contractor but are also occasionally "designated" by the employer. Mention may also be made, if only for the record, of the role played, principally by local authorities, in the granting of building permits and in inspecting work for conformity to any building codes that may exist.

4. The employer may, of course, be either public or private. However, the Mission has not significantly concerned itself with private employers. In the aggregate, these have an important impact on the volume of construction demand, but they do not either collectively or individually play a significant role in determining the conditions under which the construction industry works. On the other hand, the public employer, by virtue of the volume of work he commissions, decides to a large extent the conditions under which contractors operate - the allocation of work, the types and content of contract documents, the standards of construction, the conditions and methods of payment, etc. At the same time, it is well to recognize that there is not a single, but rather a number of public employers in every country. While a substantial part of the work may be designed, awarded and supervised by a government's Public Works Department, Ministry of Works or Ministry of Construction, there are a variety of other public employers, including other ministries, public enterprises and autonomous public agencies, municipalities and other local authorities. The contracting procedures and the general specifications and conditions of contract on which they insist may or may not be identical. In our field work we have indeed noted at times a considerable variety of practices in these respects. Even systems for licensing and classifying contractors by the type and amount of work they are qualified to perform are often not uniformly binding on all the employers in the public sector of a country.

5. Quite apart from its role as an employer or as employers of construction enterprises, the government has a significant effect on the construction industry in other ways. The size, composition and phasing of the government's development plan, and the extent to which the government carries out construction on its own account, largely determine the

volume and continuity of work available to the private construction industry. The government's financial and economic policies significantly affect private investment and thereby the amount of private investment in construction. It can influence the amount and terms of mortgage financing for private construction and the availability of credit to contractors for equipment and working capital. Through the way in which it exercises its responsibility for education and training, it can also have an important impact on the professional, technical and labor skills available to the construction industry as a whole.

6. Of necessity, therefore, we have given much consideration to the role of government as employer, generator of demand and policy-maker, but always in terms of its potentialities for decisively influencing the attainment of the objective on which we sought to center our attention, namely the development of domestic contractor-entrepreneurs and their enterprises.

Inclusion of Both Building and Civil Construction

7. Our original terms of reference asked us to consider ways and means of expanding domestic capability in the field of civil works, with particular attention to road construction. The emphasis on civil engineering works was due presumably to the fact that the Bank/Association has been engaged primarily in financing civil engineering contracts. While we did give considerable attention to road construction within the field of civil engineering, it was agreed early in our work that we should consider also the development of building. This seemed desirable for a number of reasons. While there are certain significant differences between building and civil engineering in terms of the techniques employed, the extent of equipment required, and, in some degree, in terms of scale of operations, there are also certain elements common to the two. Both involve rather similar management problems. The more complex building operations, involving framed construction, the use of reinforced concrete, and excavation and foundation work, comprise civil engineering elements. Moreover, as is illustrated by the experience in many developed countries, the evolution of the construction industry generally starts with building and at least some of the building contractors subsequently develop a capacity for civil engineering work. In Korea and Iran we noted that most of the larger contractors were engaged in both building and civil engineering, partly, no doubt, because they were thus able to exploit the opportunities of a wider market. Finally, we took note of the fact that the Bank Group itself was already to some extent directly or indirectly involved in financing the construction of schools and factories and might in the future also become more heavily involved in the financing of housing through its interest in urban development.

8. We have not considered, within either the broad or narrow definition of the construction industry, the production, supply and transport of building materials. This is not to say that constraints on the supply of building materials with respect to price, volume and quality may not have important implications for the construction industry and for the cost of construction in terms of foreign exchange. In general, however, we found that such constraints did not have an effect on the local contractor

different from that on the foreign contractor except, perhaps, in outlying areas far from major urban centers where limitations on supply are often more severe and where only local building contractors are active. While the production of building materials did not fall within our terms of reference, we did note that suppliers and transporters of materials sometimes become construction contractors. In Korea, for example, a number of large contractors were originally manufacturers and traders in building materials. Elsewhere, individuals engaged in quarrying and supplying crushed stone and aggregate have become minor civil works contractors. We have recognized also the importance of the role of building materials merchants in determining the availability of credit.

The Domestic Construction Industry

9. Since we were asked to devise ways and means of developing a "domestic" construction industry, the word "domestic" requires definition. "Domestic" may be defined in terms of both ownership and residence. We were concerned with the development of "domestic" industry in terms of ownership, i.e. with construction enterprises owned by one or more individuals of local nationality or, if in corporate form, owned in major part by nationals of the country. The "local" construction industry defined in terms of residence may be much broader. It includes local resident firms of foreign ownership which fall into two rather distinct categories: (1) enterprises owned by foreign nationals who are resident in the country and who carry on no business activity outside the country; and (2) enterprises which are local branches or affiliates of construction enterprises doing business on an international scale. Finally, there are the nonresident contractors who occasionally enter the country to carry out specific work but who, because they have no equipment or staff permanently in the country, have rather heavy mobilization costs which tend to make them competitive only for major or specialized jobs. In Korea and Iran we found no resident foreign contractors in the first of the two categories mentioned above. On the other hand, this type of contractor is particularly prominent in most African countries. In Kenya and Ethiopia, for example, Asians and Italians have long dominated the local construction industry; and elsewhere in Africa many resident foreign nationals - Lebanese, French, Asians and Italians - are also engaged in construction. Thus in Africa it is the competition from such resident foreign nationals that the emerging domestic contractor must be enabled to meet in the early stages of his development. This is not to say that the elimination of this type of foreign contractor should be an objective of government policy. While a government may well wish to accord special promotional assistance to its own nationals, it may at the same time have an interest in retaining local foreign contractors whose construction business is confined to the country and whose operations do not entail a significant drain on foreign exchange resources through the remittance of profits and overheads. In fact, a government may find it desirable to include with the scope of a contractor development program those enterprises owned by local foreign residents which are not fully qualified by virtue of their size and experience to undertake a wide range of construction work.

B. Characteristic Features of Construction

10. In considering the problems of developing a construction industry, we found it necessary to examine at the outset the peculiar features of this industry which are different in nature or degree from, say, those encountered in manufacturing and which accordingly must be taken into account. Among these features are: (1) the high proportion of demand that originates in the public sector; (2) the discontinuities and fluctuations in the demand for construction; (3) the variations in technology and degree of capital intensity; (4) the lack of standardization of the product; (5) the geographic dispersion of construction activity; and (6) the special risks inherent in the duration of contracts, the exposure of construction to damage or interruption by the natural elements, and the difficulties caused by unanticipated site conditions and changes in the client's demands. Each of these will be briefly examined.

11. Most of construction demand in developing countries originates in the public sector, with the government and various public agencies and authorities. This is particularly true where, as in Korea, Iran and Ethiopia, the greater part of residential building does not fall within the purview of the organized construction industry but is carried out by prospective home owners who act as their own contractors, employing artisans and furnishing them with the necessary materials. After eliminating this type of residential building, we found that in Korea, Iran and Ethiopia the public sector accounted for between 70 and 80% of total construction demand. This preponderance of public demand has both advantages and disadvantages for the construction industry. As the principal generator of demand the government has the potentiality for guiding and influencing the construction industry in a positive sense. It also makes the industry less susceptible to variations in private demand. On the other hand, it does make the industry extremely dependent on the government. The total volume of public demand or its composition may vary considerably in accordance with the effectiveness with which public outlays on construction are planned, the availability of external aid and the fluctuations in government resources arising from such factors as the country's dependence on relatively few export commodities. The dependence of the construction industry on public demand tends to create an unequal partnership in which the government largely dictates the terms and conditions under which the construction industry has to work. Under these circumstances political favoritism and corruption often affect the allocation and enforcement of contracts.

12. Construction demand is subject to discontinuities and fluctuations. Demand consists of a number of discrete jobs. The individual contractor competing in the market has no assurance of finding new work when he finishes his existing contract or contracts. He may well experience a period of complete or partial idleness between contracts even under conditions where total construction demand is steady or is rising. Investment activity as the determinant of aggregate construction demand tends to fluctuate more widely than the demand for manufactured consumer goods. In small and relatively poor countries, where the volume of construction is

usually very limited, a few major projects may cause a rapid and temporary increase in construction followed again by a sharp decline. Even countries, such as Korea and Ethiopia where we noted a rather steady increase in the volume of public construction, the construction industry was affected by considerable variations in the volume of private commercial building. Under these conditions construction enterprises are subject to considerable market risks which often make it difficult for them to obtain necessary financing, to develop and maintain permanent construction staffs and to meet depreciation costs on their equipment.

13. Construction still provides opportunities for a considerable choice of technology involving various combinations of the factors of production, particularly capital (equipment) and labor. This choice has been illuminated in an ongoing IBRD Study of the Substitution of Labor for Equipment in Road Construction. Governments therefore have opportunities to promote more labor-intensive technologies where these are necessary to cope with severe unemployment and underemployment problems. It should be noted, however, that the construction industry as a whole is considerably less capital-intensive than the manufacturing industry. This is particularly true of building. Civil works construction, on the other hand, usually involves, at least in practice, the use of a considerable amount of machinery and equipment. In this field, there is accordingly a great need to consider ways and means of economizing on equipment outlays and of obtaining a fuller utilization of such equipment through greater continuity of work.

14. The construction industry, unlike most of the manufacturing industry, does not produce a standardized product. Nearly all construction projects are custom-built, that is, tailored to the particular requirements of the user. To some extent, to be sure, there are programs calling for the construction of a number of more or less standardized units, but even in those cases designs often have to be adapted to different sites and costs vary in accordance with the cost of materials and the wages and productivity of labor that can be mobilized at such sites. Since most projects have special characteristics and specifications, past experience is not always an adequate guide to the estimation of costs. This again increases the risks involved.

15. By its very nature construction is geographically dispersed. Plant, materials and labor must be brought to the site, and special care must accordingly be taken to price these factors of production at the site. The problem of management is more complicated because the contractor's office is some distance removed from the site and supervision must often be provided on a number of sites at the same time. The geographic dispersion of construction also produces a large number of small contractors whose activity is confined to a particular locality. This is particularly true of building. Thus even in developed countries the building industry

is characterized by the existence of many small contractors.^{1/} This fact must be taken into account in any efforts to develop a domestic building industry.

16. Apart from the risks inherent in the market, the construction industry is exposed to a variety of other risks. Although most small building jobs need take only a short time, major building and construction works may take two or more years during which prices and wages may well increase significantly, particularly under inflationary conditions. Construction is subject to interruption and damage by rain, storms, floods, droughts and freezing, and it is difficult in such cases to anticipate the duration and extent of the interruption or damage. Unexpected soil or ground conditions may be encountered, labor difficulties may arise, deliveries of equipment and materials may be delayed, and the client may change his requirements and design. The impact and degree of probability of many of these contingencies, as well as the respective responsibilities of the employer and contractor for the additional or extra costs involved are difficult to determine in advance except as they are defined in the contract documents or dictated by law.

C. Costs and Benefits of Developing Domestic Construction Capacity

17. Before addressing ourselves to the various elements of a program for developing a domestic construction industry, we need to examine the importance a developing country should attach to the construction industry and the potential costs and benefits of developing a domestic construction capability.

18. There is little doubt that the construction industry is of crucial importance to economic development. Previous studies^{2/} have disclosed that new construction usually accounts for between 45 and 60% of fixed capital investment. Our own findings in the countries we visited have confirmed this. In Korea, Iran and Ethiopia the proportion in each case averaged about 60% during the last five years for which estimates were available. Any developing country thus has an important stake in ensuring that construction is carried out at the lowest possible cost, and therefore in improving the efficiency of the construction industry as far as possible. The lack of effective indigenous building capacity often

^{1/} Thus in the United Kingdom there were still 73,248 construction enterprises in 1970. Of these, 33,118 employed seven persons or less and accounted for about 9% of the total work, while 70,821 firms employed 50 or less persons and accounted for almost 35% of the volume of construction business. See Department of Environment, Annual Bulletin of Construction Statistics, 1970, Tables 20 and 23.

^{2/} See D.A. Turin, The Construction Industry; Its Economic Significance and Its Role in Development (London University College, Environmental Research Group, June 1969), p. B7.

seriously limits the success of efforts to stimulate in localities remote from the main urban areas where resident and nonresident foreign contractors are primarily active at the local level. Construction can also generate considerable employment and make a significant contribution to national output. In the majority of developing countries construction accounts for between 2 and 6% of all employment and contributes between 3 and 5% of gross domestic product^{1/} - proportions that become substantially higher when the employment and the contribution of the subsistence agricultural sectors are disregarded and only the modern sector of the economy is included.^{2/}

19. These indications of the role that construction plays in economic development do not, of course, necessarily imply that efforts to promote an indigenously-owned construction industry should result in the progressive replacement of all foreign contractors. At the local level small domestic building contractors can often be developed to meet a demand that is not yet being adequately satisfied. Moreover, in virtually all countries some domestic construction capacity already exists, particularly with respect to small jobs in the so-called conventional building field in which even resident foreign contractors may not be interested either because of the size or because of the location of the job. Under circumstances this type of conventional building activity may already attain a considerable total volume, and the government of the country may well find it advantageous, in the first instance, to concentrate on improving the standards and lowering the costs of construction at which domestic contractors active in this field are working. Sooner or later, however, the question of developing domestic construction capacity in the fields now largely or exclusively dominated by resident and nonresident foreign contractors will arise. At that stage the question of the comparative cost of having the work done by domestic contractors as against foreign contractors becomes relevant; and in launching a program for developing domestic contractors capable of doing this work, appropriate attention has to be paid to the potential benefits and costs involved and methods of appraising these.

The Benefits

20. What can be said of the potential benefits of developing a domestic construction industry in this sense? The types of benefits that might accrue can be discussed under various headings.

Greater Local Employment

21. In general the displacement of foreign contractors with domestic contractors cannot be expected to generate a significant increase in local

^{1/} See D.A. Turin, The Construction Industry; Its Economic Significance and Its Role in Development (London University College, Environmental Research Group, June 1969), pp. B11 and B4.

^{2/} For example, if agriculture is excluded, construction in Africa employs generally from 8 to 14% of the economically active population.

employment unless it can be demonstrated that the latter will and should employ a more labor-intensive technology than the former. In the countries we visited we found little or no evidence that domestic contractors were deliberately choosing a technology different from that of the foreign contractor; and where they were working with less equipment than a foreign contractor would normally employ, they appeared to be doing this largely because financial and other constraints beyond their control dictated this course of action. However, it is not inconceivable that construction technologies better adapted to the relative real cost of the factors of production - capital and labor - can and will be devised; and, indeed a study exploring the relative merits of alternative technologies of carrying out various types of construction activities is currently being pursued in the Bank. If such a particular technology adapted to the needs of a country can be worked out, the government of that country can probably exert a greater influence to secure the adoption of such a technology by local contractors (both domestic contractors and resident foreign contractors) than in the case of nonresident contractors who are active in a number of countries and are probably reluctant to change their technology from one country to another.

22. In the absence of a differentiated technology, foreign contractors are likely to employ about the same amount of labor as domestic contractors. However, the development of a domestic construction industry will provide additional opportunities for indigenous enterprise in general. Moreover, it is likely to create more employment opportunities and somewhat more permanent opportunities for high-level manpower of local nationality (engineers, technicians and other supervisory personnel) than in the case of foreign contractors who, if they are locally resident, are inclined frequently to employ their own resident fellow-nationals, or, if they are nonresident, may not wish to rely entirely on such local manpower and will, in any event, be unable to assure it permanent employment. Finally, it is probable that in the long run domestic contractors will have a stronger interest than foreign contractors (although not necessarily locally resident foreign contractors) in employing local subcontractors and developing a local pool of trained manpower in view of their continuous stake in construction. However, during the early stage of their development, it is possible that the domestic contractors will have a lesser appreciation of the need, and a smaller capacity, for training local manpower than foreign contractors. In the last analysis it must be conceded that such employment or manpower benefits as may flow from the development of a domestic construction industry may not be very great and will in any event be difficult to quantify.

Socio-Political Benefits

23. Such benefits are likely to exert a strong attraction for countries, such as those in "black" Africa where modern private business enterprise is still largely dominated by foreign nationals and foreign firms. It may well be difficult for such countries to achieve a stable political-economic system or society unless they make progress in the

direction of giving their nationals a greater stake and participation in economic life. They may thus find it necessary to promote a domestic construction industry as part of a general program for promoting more indigenous business enterprise in all fields of economic endeavor. While the resulting benefits may be considerable in terms of their contribution to political and economic stability, it is obviously difficult to quantify them.

Lower Construction Costs

24. The domestic construction industry when properly developed may ultimately be able to achieve lower costs than the foreign nonresident contractor. However, the factors that may make ultimately for lower costs will apply probably as much to the resident foreign contractor who remains in the country a very long time as to the domestic contractor. The local contractor may obtain cost advantages vis-a-vis the nonresident foreign contractor through his: (1) superior ability to handle local labor; (2) greater knowledge of relevant local conditions, including knowledge of the local language; (3) greater effectiveness in handling relations with clients, particularly the government and public agencies; (4) lower overhead costs owing to the continuity of his activities in the country; and (5) ability to extend depreciation of equipment over a longer period of time because such depreciation can be charged to a series of projects rather than to one project alone. Here again it is not easy to determine when and to what extent these factors, operating in conjunction with the reduction of inefficiency due to inexperience in the early period of development, may actually reduce the cost of local contractors below those of nonresident foreign contractors. In Korea and Iran we found evidence that domestic contractors had made considerable progress in lowering their costs and becoming more competitive and that some, at least, were apparently achieving lower costs of construction than foreign contractors, although the standard of their work was probably not comparable. These findings, appropriately qualified, will be discussed in somewhat greater detail later in this chapter.

Foreign Exchange Savings

25. The employment of domestic contractors in preference to foreign contractors also results in some foreign exchange savings. If nonresident foreign contractors do the construction work, certain additional foreign exchange costs are incurred even when they do not use more imported equipment than domestic contractors. Their net profits, which may contain a considerable allowance for the risk of doing business abroad, must be remitted in foreign exchange. Those overhead expenses of their central office which are charged to the project, and that part of local or site overheads which represents the salaries of foreign supervisory personnel are also incurred in foreign exchange. In many cases virtually the entire cost of the imported equipment employed is charged to the construction project. The Mission was unable, within the

time and with the data at its disposal, to estimate the extra costs incurred as the result of these factors. Further investigation of this subject might well be rewarding. Provisionally, one may hazard the guess that such extra costs may range between 15 and 25% of the original price of the contract. It should be emphasized, however, that such additional foreign exchange outlays are incurred only when nonresident foreign contractors are employed. Thus, construction enterprises which are owned by foreign nationals who carry on all their business activity in the country and who consider the country as their permanent home are unlikely to remit their profits abroad unless they begin to feel that their continuation in business is jeopardized by the policies of the government.

26. It may be assumed that the vast majority of developing countries will continue to suffer for a considerable time from a more or less acute shortage of foreign exchange and that a premium must therefore be attached to the saving of foreign exchange. The value of this premium can be assessed only in terms of some divergence between the official rate of exchange and the "shadow" ("real" or "equilibrium") rate of exchange. If we assume, for example, that the official rate is at least 25% overvalued and that nonresident contractors remit 20% of their contract payments at the official rate, we can conclude that the real cost of this foreign exchange component is $125/100 \times 20$ or 25. Thus, if a nonresident foreign contractor had obtained a contract at 100 cost units in terms of the local currency of the country as compared with an offer by a local contractor at 105 cost units, the actual real price of the former would have to be figured at $80 + 125/100$ of 20 or $80 + 25 = 105$. Under these circumstances the real cost of the foreign contractor would not be less than that of the domestic contractor.

Costs and Cost-Benefit Comparisons

27. The potential benefits of developing domestic contractors will, of course, have to be compared with the costs of development. These costs may consist of: (1) higher initial costs of construction; (2) possible initial sacrifices in the quality or standards of construction; (3) the cost of providing training and technical assistance inputs; and (4) probably, losses on financial assistance given to developing contractors.

28. The cost-benefit ratio for any program to develop domestic construction enterprises will be difficult to compute in advance. The various cost and benefit elements are not only hard to assess in quantitative terms, but also difficult to project over the whole development period. The time required to achieve cost levels comparable to and below those of foreign contractors is obviously critical, because the present value of benefits achieved after a long time, when discounted at an appropriate rate, may well be negligible and thus tend to be more than offset by the costs of achieving them, particularly since the costs of development may be heavy in the early stages of a development program.

The length of time required to develop an efficient domestic construction industry within whatever market constraints that may obtain is likely to vary considerably. In Ethiopia and Kenya it may well take a minimum of two to three generations to develop a diversified efficient industry. On the other hand, we noted that in Korea and Iran the domestic industries had made great strides in a comparatively short time. The rapidity of development will depend on a large number of factors: (1) the entrepreneurial talent, vitality, business skills and educational qualifications of the country's population at the inception of a development program; (2) the opportunities available for learning through experience, training and technical assistance, and the ability to respond to these opportunities; and (3) the extent and effectiveness of various measures of government and external assistance to the construction industry, etc. Some of these factors will in turn be influenced by the social structure of the country and the value standards of its people.

29. The difficulty of calculating cost-benefit ratios in advance of a development exercise need not be such a serious handicap in practice as in theory. There are various ways of reducing the risks arising from this difficulty. A development program can be projected as a series of sequential phases, with each limited to a comparatively short duration, say, five years, and the commitment to go from one phase to the next can be conditioned on the results obtained during the prior phase. Development programs can be conducted on a trial basis to determine what benefits they might yield in relation to costs. Such programs can be launched in the first instance in countries or states (i.e. provinces in large countries with a federal structure) where the number of contractors who would be capable of development on the basis of their actual or potential capacity would be fairly modest. The types and total amount of construction work which would need to be given to such a group of contractors could be limited to a relatively small percentage of the total construction work in the country, and ceilings could be placed on the price at which contracts are awarded to this group. For such initial test programs of modest size, the cost of other inputs, such as financial, training and technical assistance can be correspondingly limited. Experience with these initial programs should provide a more adequate basis for an approximate estimate of the costs and benefits that might be involved in continuing and more extensive development exercises of this sort.

D. Findings of the Country Studies

30. The countries which were the subject of field investigations by the Mission exemplified a wide range of conditions encompassing a rather advanced stage of development in Korea and Iran and a very early stage of development in Ethiopia and Kenya. While the Mission was considerably handicapped by limitations of time and data, it was nonetheless possible to identify some of the critical factors that had stimulated or inhibited development and to diagnose some of the more important problems that had

arisen in the course of development. The Mission's findings in each of the countries are given in some detail in appendices to this report. Here we shall attempt only to sum up the conclusions considered relevant to the elaboration of a framework within which the development of domestic construction industries may be planned. In this connection it should be noted, however, that we did not attempt to examine the construction industry as a whole in Kenya, but confined our attention to the efforts of the National Construction Company to assist African contractors.

Importance of the Market

31. Our findings indicate that the size of the construction market and the rapidity at which it expands are of great importance. In 1969 gross fixed capital formation in the form of construction amounted to US\$1,254 million and US\$1,080 million in Iran and Korea respectively, but to only US\$103 million in Ethiopia. Obviously the opportunities for developing an efficient and diversified local construction industry have been far greater in the first two countries than in Ethiopia. Moreover, in Ethiopia the volume of investment in construction and the contribution of construction to gross domestic product increased, but slowly - probably at an average annual rate not exceeding 5 or 6% in the period 1961-1969. On the other hand, investment in construction and the volume added by construction in Korea are estimated to have risen at rates of 20% and 19%, respectively during the same period, and in Iran, at rates which averaged nearly 11% and 8% in the 11 years ended 1960-1971, but were considerably higher in the period since 1963/1964. The rapid expansion in demand in these two countries afforded considerable opportunities for local firms to participate in construction.

Opportunities for "Learning Experience"

32. In both Korea and Iran the government disposed of substantial funds which it was free to utilize in such a way as to reserve, in practice, a considerable and growing share of construction for indigenous contractors. Korea received from the United States large amounts of non-project or commodity assistance the proceeds of which it could use to finance construction work without any obligation to employ foreign contractors. In addition, it was able to increase its own public savings dramatically with the rapid growth in its economy. In Iran oil revenues quintupled from 1963/1964 to 1970/1971 and made it possible for the Plan Organization to finance most development projects under conditions which protected domestic contractors from foreign competition. Thus, developing Korean and Iranian contractors were probably able to get considerably more work than would have been possible had they in all instances encountered competition from more experienced foreign firms; and since actual experience in carrying out construction has invariably proved the best teacher, we believe that this did help to accelerate development of construction industries in these two countries. In Ethiopia we found a quite different situation. Ethiopia is a much poorer country, with a far lower rate of economic growth. Since its public savings have been modest,

it has been much more dependent on external aid for financing of major construction projects. Local construction enterprises, including resident Italian firms, have therefore had much greater difficulty in acquiring the experience, particularly in civil works, that would qualify them to compete with foreign contractors in carrying out construction projects financed with external assistance.

The Entrepreneurial Spirit

33. Our findings indicate, nowever, that the development of domestic construction industries is a function not only of opportunities for gaining experience, but also of the availability of enterprise to take advantage of these opportunities. Korea and, to a large extent, also Iran have been characterized by a spirit of vigorous private enterprise. In Korea businessmen, labor unions and the government have all worked since the early sixties under a strong, national discipline which has emphasized initiative, hard work and achievement. In both countries the government has encouraged private enterprise, and educated people were attracted to business careers. In Ethiopia, on the other hand, the prevailing culture did not until recently accord a high standing to businessmen. In Kenya Africans were long confined to agriculture and the service trades, and the modern sector of the economy was dominated by expatriate firms and locally resident Asians. While there has been a considerable burgeoning of African entrepreneurship over the last decade, African businessmen in Kenya for the most part still operate at a very low level of educational and technical qualifications.

Achievement of the Korean and Iranian Construction Industries

34. Under these circumstances the domestic construction industries in Korea and Iran have made rapid progress. In Korea the domestic construction industry has become capable of meeting virtually all the demand. Foreign firms are now employed only for specialized jobs, particularly in the field of heavy industrial construction. The range of civil work carried out by the Korean construction industry is very wide, comprising express highways, as well as other roads and bridges, flood control and irrigation, water supply and sewerage, dam construction and even port work of considerable complexity and sophistication. Korean contractors have been able to obtain a growing amount of business abroad, although with the help of some subsidies from the government. The volume of contract work completed abroad, which was initially confined to Vietnam, but extended to nine countries or areas by 1971, rose from US\$11,003,000 in 1966 to US\$56,139,000 in 1971. In Iran, too, the indigenous construction industry has become largely self-sufficient. The share of foreign contractors in the construction market has significantly diminished. Foreign contractors are now for the most part employed only for major dam and port works. During the third and fourth Plans all road contracts, including those financed by the Bank, were awarded after competitive bidding to Iranian firms with only one exception; and that exception was due to the fact that foreign firms were allowed, in contrast to Iranian contractors, to bid on more

than one "road lot" and to offer a discount if they were awarded more than one "lot." Of the two major irrigation and road contracts awarded in the Khuzestan area under Bank financing, the first was awarded to an Italian contractor largely because no Iranian firms were qualified for bidding, but the second was awarded to an Iranian contractor who won out over five foreign competitors and submitted unit prices 20% below those in the first contract.

35. There is little doubt that Korean and Iranian contractors have become increasingly competitive with foreign firms. However, the data made available to the Mission did not make it possible to reach really valid and conclusive judgments on the comparative costs of indigenous and foreign contractors. The standard of construction of these two types of contractors are often not comparable. We found, for instance, that the quality and finish of the work carried out by Korean and Iranian contractors were in many cases not up to international standards. While Korean and Iranian firms often bid lower than their foreign competitors, this is not entirely conclusive evidence that their costs are lower. Underbidding is often the result of excessive competition or of failures to make accurate cost estimates. The final price at which a contract is completed is in many cases higher than the price at which it was awarded; and this final cost is not easy to compare with the cost at which a foreign contractor might have completed the job because it is difficult to determine whether the foreign contractor would have been entitled, on objective grounds, to claim the same price adjustments as the domestic contractor was able to obtain. For example, in Iran it is estimated that the final price of completing six road contracts financed by Bank Loan 411 and carried out by Iranian firms is likely to be 30% in excess of the total original contract price. On five contracts the final cost is expected to range from 30% to 63.5% above the original contract price; and on only one contract is the final price estimated to be below the amount at which it was awarded. While the Ministry of Roads claims that the final cost will still be below that at which foreign contractors would have been willing to do the work, the data available to the Mission did not permit it to verify the validity of this claim. Despite the difficulties of making cost comparisons, the Mission believes that the experience of Korea and Iran does demonstrate that domestic construction industries do have the potential of achieving cost levels lower than those of nonresident foreign contractors. Under favorable conditions, such as those in Korea and Iran, this potential can probably be realized in a comparatively short time, say, in 10 to 20 years. On the other hand, in a country like Kenya, which is handicapped by a very low level of entrepreneurial and technical skills, it may take four or five decades to develop a domestic industry capable of carrying out complex building and civil construction projects and of meeting foreign competition in this field.

Competition

36. In all the countries visited the Mission examined the role of competition in the development of the construction industry. Everywhere

competition was restricted in various ways. We have already noted that in Korea and Iran competition for construction work financed from local resources was to a large extent limited to local contractors. In Kenya the National Construction Company has actively procured contracts to give African contractors practical work experience, and it has let most of such contracts without competitive tendering. In Korea we found that a considerable part of the total value of contracts - 39.9% in 1969 and 36.5% in 1970 - have been awarded through negotiation with designated contractors. In the case of large construction contracts it is also a widespread practice in Korea to confine competitive bidding to the initial part of the construction work and to negotiate subsequent contracts with the firm which was successful in obtaining the first contract. In both Korea and Iran the most prevalent practice, except in the case of small construction projects, has been to award public contracts after competition among a selected group of firms. While this procedure is prompted principally by a desire to limit bidding to enterprises qualified to do the particular work put out to tender, it has also been motivated by a concern to "rotate" among contractors the opportunities to bid for, and share in, the available volume of work. In this connection we have noted that some degree of continuity of work is essential to the development of a sound construction enterprise. Without this it is extremely difficult to build up a permanent staff with the requisite managerial and technical experience and to obtain necessary financing. Continuity of work is especially important for civil works contractors who must make considerable investments in equipment and cannot bear the cost of amortizing this equipment during prolonged periods of idleness.

37. In all the countries we visited, except in Ethiopia, competition has also been restricted by limiting the practice of accepting the lowest bid. To the extent that works had been awarded to African contractors in Kenya after competitive tendering, bids that have appeared excessively low in relation to the government's own cost estimates have usually been ignored on the ground that the contractor would only get into difficulty if he were given the work on the terms preferred. In Korea there were no safeguards against excessively low bidding until quite recently. In the last few years, however, the increase in the total volume of construction demand has levelled off and demand for certain types of construction work has actually declined, thus greatly increasing competition for the available work. Beginning in 1972 the government accordingly put a "floor" under bids. The Iranian government has experimented with a succession of measures to prevent the award of contracts to low bidders who have often been unable in the past to complete work within the price they bid without substantial adjustments in the original price of the contract. The adoption of such devices has been occasioned partly by inadequate experience in the preparation of cost estimates and partly by the licensing or qualification of contractors well in excess of the available volume of work.

Classification and Qualification of Contractors.

38. We found, indeed that the problem of classifying or qualifying contractors by the type and amount of work they could perform had not been

satisfactorily resolved. In practice it is difficult to devise a classification system flexible enough to meet the fluid requirements that characterize development. Such a system must provide, on the one hand, for the emergence of new contractors with an appropriate background of experience and education, and, on the other hand, for continuous screening of existing contractors on the basis of their performance. While it can license a number of contractors somewhat in excess of the market in order to allow both for attrition (i.e. failures) and some measure of competition, some control over the total number must be maintained. We found that the existing systems of classification could not generally be faulted for their failure to admit new contractors. In fact there is a tendency to be excessively liberal in this respect. In Kenya, for instance, the National Construction Company has qualified, under political pressure, far too many African "would be" contractors for its assistance program without screening them adequately on the basis of their motivation, their appreciation of construction problems and their technical and managerial qualifications. In Iran the principal deficiency of the classification system has been its failure to alter the classification of existing contractors on the basis of their performance and changes in their management and organization. Firms in the higher classes have been allowed to retain their rating even when their performance has been poor, and they no longer have capable management. This has prevented newer and professionally better qualified firms from achieving higher classifications in many cases, and has occasionally compelled such firms to resort to the illegal expedient of buying contracts from others who had more work than they could handle or who had obtained work they were no longer capable of performing because they had been allowed to remain in a class which they no longer merited.

39. One of the problems of classifying contractors has been the difficulty of devising and applying adequate and objective criteria. We found that the criteria applied and the degree of weight given to each were often not clear. In varying degrees the size and qualifications of the contractor's permanent staff, the financial resources of the firm, the volume of work done in the past, the ownership of equipment and even the possession of an office and telephone may all be taken into account.

40. In general it seems to us that too much emphasis has been put on the ownership of equipment. While civil works contractors in particular must be able to demonstrate their ability to utilize and maintain equipment, a requirement that a contractor possess adequate equipment even to qualify for bidding excessively militates against new construction firms with limited financial resources and tends to encourage overinvestment in equipment by the construction industry. The recent attempt of the Ministry of Works in Ethiopia to introduce a new system of classification requiring a contractor to own enough equipment to enable him "to adequately perform works at the level at which he is applying" appeared to us particularly ill-advised, considering the severely limited total demand for civil works and the lack of any special financing arrangements that would enable contractors with relatively modest financial resources to buy the required plant.

41. Even if new contractors are adequately screened on the basis of previous technical or business experience, educational qualifications, motivation, etc. before being licensed, only their actual performance is likely to demonstrate their capacity for development. In the classification systems with which we became familiar, the performance criteria which were supposed to govern the reclassification and, in theory at least, also the disqualification of licensed contractors impressed us as inadequate in several respects. Little or no emphasis is usually paid, for example, to the extent to which the construction firm has demonstrated its capacity to expand and improve its organization and management in terms of the experience, technical qualifications and size of its permanent staff and of a wider sharing of management responsibility among top personnel. Firms are generally classified only on the basis of the maximum size of contract they are deemed capable of handling in the light of past experience and with little regard to the quality of their work and their demonstrated capacity to manage several or more construction jobs simultaneously. In assessing the financial qualifications of firms insufficient weight appears to be given to the progress made by these firms in improving their net worth and their creditworthiness with established financial institutions. In Iran the Plan Organization is now making a constructive attempt to introduce a new classification system designed to remedy the deficiencies mentioned above and to give maximum weight to the capacity shown by firms in improving their technical staff, organization and management, the quality of their work and their financial and credit standing. For details of this new scheme the reader is referred to Appendix 2 of this report.

The Role of Education and Training

42. The Mission was interested in determining the role of education and training in the development of construction industries in the four countries it visited. In Korea the comparatively high educational level of the entrepreneurs, professional and technical personnel, and even of the labor engaged in construction, has apparently been a positive factor in the development of the construction industry in that country. In Iran entrepreneurs have also had the benefit of rather high level of formal education, but construction labor is still largely illiterate and for the most part incapable of reading blueprints. In Kenya relatively few African contractors, were found to have more than an elementary education, and construction labor is handicapped by the same deficiency as in Iran. While a high level of formal education is not essential for small contractors and subcontractors, our observations indicate that poorly educated entrepreneurs are seriously handicapped in acquiring the business and managerial skills and in employing the professional and technical personnel that are required for carrying out major building and civil works.

43. The Mission also found that government educational planning to meet the manpower skills required for construction has in several respects been inadequate. The number of engineers has generally been sufficient except in Kenya where the limited supply of African engineers presumably accounts for the fact that at best only one or two of them have gone into

the construction business. In Ethiopia, in contrast to Kenya, many more trained engineers are available so that a considerable proportion of the admittedly limited number of Ethiopian construction firms have been launched by engineers. Everywhere the education of engineers has been excessively design-oriented with consequent neglect of the problems involved in construction. The most serious manpower deficiency we noted was at the intermediate skill level, namely technicians and foremen. This was most marked in Iran where relatively highly paid engineers often have to do the work normally carried out by such personnel who really should be the backbone of the construction industry. Only in Ethiopia has much attention been paid to the training of technicians; and there, indeed, the number of building technicians turned out has been well in excess of the employment opportunities available in the small-scale local construction industry.

44. It was noteworthy that construction labor has been almost entirely trained in the job. Technical and vocational schools have apparently made little or no contribution to the available pool of labor skills in spite of substantial expenditures on these institutions. The Mission was unable to examine adequately the causes of this failure. It was apparent, however, that technical and vocational schools often lacked instructors with practical experience in industry, and that curricula were poorly adapted to the practical requirements of industry.

45. Informal training experiences have been of considerable value in the development of construction enterprises. This is particularly true of Korea. In that country emerging Korean contractors learned a great deal in the period immediately after the Korean War from their association with defense and post-war reconstruction work financed by the United States and carried out under the direction first of the US Army Engineers and later of the US Corps of Engineers. Initially they worked primarily as subcontractors to American firms and, at a later stage, in joint ventures with such firms. In this way they first learned how to work with equipment and in accordance with specifications. The Korean Army, working in close cooperation with the US armed forces in Korea, trained many Koreans in a wide range of skills, including the operation and maintenance of equipment. Many Korean army engineers and nonengineer officers benefited from supplementary technical and management training in the United States and subsequently became active in the construction industry. In other countries, we found no evidence that training provided by the armed forces had any significant impact on the development of indigenous construction capacity. In Iran the initial group of construction entrepreneurs acquired experience by first working as subcontractors to foreign firms carrying out railway construction; and the foreign consulting engineering firms long active in that country have made a considerable contribution to the practical training of engineers and draftsmen.

46. Kenya is the only country in which we found a program to provide training and advice to indigenous contractors. This program, administered

by the National Construction Company (NCC) and carried out largely with Norwegian building supervisors and training officers, has had only limited success. There has not been sufficiently close cooperation and coordination between the building supervisors who have been responsible for advising contractors and the training officers who have organized short-term courses and seminars for contractors and their personnel. The building supervisors have been primarily technical in their orientation and have for the most part not been adequately equipped to advise on the business and management aspects of construction in which African contractors have generally been most deficient. Efforts to make contractors aware of their serious limitations have been only partially successful, so that insufficient advantage has been taken of the opportunities for obtaining advice and training. Moreover, as the NCC accepted an increasing measure of responsibility for construction programs and projects obtained for allocation to individual contractors, the basic task of assisting selected contractors to develop their enterprises has been neglected owing to the growing preoccupation of building supervisors with the proper completion of individual contracts. Finally, the training and advisory activities have been dispersed over too many contractors and have accordingly failed to focus on those who have demonstrated real potential for development.

Contract Documents and Contract Execution

47. In our field work we were impressed by the fact that the contractors have had little or no say in determining the terms and conditions under which they carry out public works. The public authorities as "employers" have virtually dictated the form and content of contract documents apart from the price. The specific terms of the contract, supplemented by general conditions of contract, general specifications and codes of construction standards, have been strongly influenced by those prevailing in developed countries and are often not fully understood by local contractors. In their provisions for the settlement of disputes and for the allocation of responsibility for variations and unanticipated conditions contracts have in many cases been heavily weighted in favor of the public employer, thereby forcing the new and relatively inexperienced indigenous contractor to assume risks which he is really incapable of bearing. The inspectors used by the public employer also tend to create problems for the contractor by insisting on literal compliance with all specifications without regard to their relevance to the achievement of the basic purpose the project must serve. The government inspector is generally the undisputed "king" on the construction site. Finally, delays in payment by the employer have frequently aggravated the financing problems of the contractor.

Financing of Contractors

48. We found that many developing contractors have had considerable difficulty in obtaining the guarantees or sureties required for bidding, performance and maintenance and the requisite financing for working capital and equipment. At best the normal investment and commercial banks

and the insurance companies are wary about financing contractors in view of the unusual risks to which the construction business is exposed. In Iran it was only after a number of the leading construction enterprises had established a special institution to provide financing for contractors that other banks began to evince much interest in providing loans and guarantees. In Korea the government has assisted contractors to form a financial cooperative, but the resources of this cooperative have never been sufficient to provide a significant amount of working capital. While the larger and long-established contractors for the most part experience no serious financing problems, new or relatively new enterprises are severely handicapped by a shortage of financial resources. Their capacity to provide initial equity capital is often very limited, as is their ability to furnish property as security for loans and guarantees. Under these conditions financing is usually available only in inadequate volume and on rather onerous terms. We found no government facilities for financing contractors or underwriting at least a portion of the credit risk except in Kenya where the Kenyan and Norwegian governments have cooperated to establish a special public fund from which contractors could obtain loans. However, the management of this fund has been open to serious criticism; losses have been excessive, principally owing to inadequate screening and supervision of borrowers.

Lack of Planning

40. Finally, it is important to note that Kenya is the only country where we found that the government had launched a more or less comprehensive program for the development of an indigenous construction industry. This program in principle contains most of the essential ingredients - reservation of contracts to provide work experience, advice and training, and special financial assistance - but, as we have already had occasion to observe, it has not been carried out very effectively.^{1/} Elsewhere, the construction industry, unlike the manufacturing industry, has not been the object of coherent government planning despite its critical role in development. True, measures that have contributed to the promotion of the industry have been taken, but generally only on an ad hoc basis. We found that government economic planning agencies have paid little or no attention to the implications of general development plans for the construction industry. With the limited exception of Kenya, none of the countries visited had a single ministry or agency responsible for looking after the interests of the construction industry. The lack of centralized responsibility for this industry was undoubtedly the principal cause of the dearth of reliable statistical data and documentation on construction which seriously handicapped our field investigations. This situation is by no means unique. A study carried out in 1966 by the Economic Commission for Africa concluded, for example, "that the role of the public authorities

^{1/} For a fuller analysis of his program, see Appendix 1.

in the field of construction is limited in scope and extent and that there is a lack of a clear and comprehensive policy of action in the construction sector."^{1/}

E. A Framework for Planning Development

50. The Mission will now indicate how in its opinion the task of developing a domestic construction industry might be approached and what might be the general content and scope of such a developing program. For this purpose we have drawn in the first instance on our field studies. However, in view of the serious inadequacies of data encountered in the field and the limited time we could devote to the country case studies, we also found it necessary to draw heavily on our individual experience and knowledge both of the technical and management problems of construction and of the general development process and the factors which affect it.

51. It should be emphasized at the outset that no development program can succeed unless there is a clear-cut commitment by the government to the basic principles involved in the promotion of a domestic construction industry. Lip service to the promotion of such an industry will not be sufficient. The government will have to create a climate conducive to the development of private construction enterprise though this need not preclude the participation of public enterprises in construction on the same terms as private individuals and firms. Contractors must be given opportunities to carry out work in accordance with their capacity and under terms that are not unduly weighted in favor of the government as employer. They must be enabled to carry out their work without arbitrary interference from government inspectors and supervisors and under conditions ensuring that disputes between the two parties to the contract are settled equitably and speedily. It will be necessary to vest responsibility for coordinating all policies and measures relating to the development of the industry in a single agency under appropriate institutional arrangements which will ensure that the favoritism and corruption which often characterize the relations between the construction industry and the public authorities are kept at a minimum consistent with the objective administration of the program. Such an agency should be staffed with capable people who are dedicated to the efficient promotion of the construction industry rather than simply to its control. Promotional measures should not be confined simply to those that would protect the industry against foreign competition through price preferences or the reservation of construction contracts

^{1/} The Construction Industries in Development Programmes: A Techno-Economic Review in the West African Sub-Region (UN Economic & Social Council, E/CN.14/IRR/107, July 7, 1966), p.31.

to domestic enterprises. Vigorous steps must be taken to ensure progressive improvement in the efficiency of the domestic industry by providing effective training and technical assistance and by weeding out contractors who fail to demonstrate their capacity for development. Special financial assistance will have to be furnished on a discriminating basis. The government must take measures to assess and, as far as possible, plan construction demand in order to determine the limits within which the construction industry can develop and to ensure the industry some continuity of work. Finally, the government must realize that any development program will of necessity be rather experimental in character and therefore require periodic revision in the light of experience, and that such a program will entail costs both for the economy and for public budget.

52. The first step in working out a development program should be to project the volume and nature of the demand for construction and to assess the actual and potential capacity of the domestic industry to meet this demand. This will help to determine the size and structure of the domestic construction industry that can be developed within the parameters of potential demand and supply. Chapter II of this report will deal with these questions as well as the desirability and feasibility of planning construction for the purpose of ensuring greater stability in the demand for construction and therefore in the volume of work available to the industry.

53. It should be emphasized that we have not devised a general prescription for the development of domestic construction industries. In the last analysis programs must be framed for particular countries and their specific content must be adapted to the special requirements and circumstances of these countries - the socio-political conditions, the institutional framework, the market constraints, and stage of development of the construction industry. Our suggestions must therefore be primarily considered as guidelines to be applied in planning programs for particular countries. However, we do believe it possible to make certain recommendations on the scope and content of any development program and on methods for handling the various types of problems that will arise in the course of the development of a domestic construction industry.

Essential Features of a Development Program

54. The type of program we envisage, within the framework of government policies and commitments outlined previously, would focus on a new and existing but relatively inexperienced contractors who are deemed to have a capacity for development but are as yet incapable of standing on their own feet without outside assistance. Not everyone with aspirations to be a contractor irrespective of his qualifications would be allowed to benefit from a development program. An autonomous public agency in charge of contractor development would qualify already active contractors on the basis of their past performance and admit new entrants into the industry

on evidence of their commitment, their entrepreneurial skill and their educational, technical and professional qualifications.^{1/} The total number thus qualified would need to be fixed in relation to the availability of the types of construction work of which they would be capable, but with an appropriate allowance for inevitable attrition. The object would be not to set up an elite group from which qualified or potentially qualified members would be excluded, but rather to improve the prospects for development of successful contractors by eliminating those with little or no promise. The size and composition of the group of developing contractors would not be static. Those failing to respond to assistance and to make progress would be eliminated or would be allowed to fail. Others who make satisfactory progress would progressively need less assistance and would finally "graduate" from the group. New members who appear promising on the basis of their background and prior experience would from time to time be admitted. The program would focus not simply on the entrepreneur, but also on the construction firm so that the technical and managerial organization and financial resources of the enterprise as a whole would be developed to enable it to expand its capacity to undertake work. Eventually the contractors developed in this manner by the contractor development agency would presumably be qualified to carry out all types of construction work for which there would be an adequate demand.

55. The group of contractors would benefit from various kinds of assistance. Some construction work suited to their capacity would be reserved to the group, subject to certain conditions, in order to provide opportunities for "learning experiences" and the degree of continuity of employment required for developing the staff and the financial strength of the enterprise. The contractors of the group would be exposed only gradually to the risks of competition. Their practical work experience would be supplemented by individual advice and group training provided by a group of experts qualified to assist contractors on their business and management problems as well as on their technical problems. Special financial assistance would be provided until the contractors have developed their creditworthiness sufficiently to enable them to obtain credit from the normal financial institutions. Measures would be taken to break down construction work as far as feasible into individual contracts and sub-contracts so as to increase the opportunities of domestic enterprises to participate in such construction. Similarly, efforts would be made to adapt the design, specifications and standards of construction of individual projects to the capacity of the contractors consistent with the achievement of the basic purposes which such projects are intended to serve. The terms and conditions of construction contracts would provide for an appropriate division of responsibility and risks between the public authorities in their capacity as employers and the contractors. Thus the responsibility for risks arising out of errors in bidding, failure to complete contracts in time and additional or extra costs caused by such factors as contractor's negligence, weather conditions, failure to verify designs and

^{1/} See Section D of Chapter II.

drawings and escalation of the cost of materials, labor and equipment would be fixed in such a way as to limit the contractor's liability initially but gradually accustom him to assume the risks normally borne by the experienced contractor.

The Time Frame of Development

56. The progressive development of domestic construction capability inevitably entails a rather long period of time. We therefore found it necessary to adopt some form of time frame and to relate the development program in terms of its composition and the methods of dealing with various problems to the successive phases of development which contractors and the domestic construction industry as a whole might be expected to experience. We have somewhat arbitrarily and schematically divided this time frame into an "early," "intermediate" and "late" phase of development. Obviously there can be no clear-cut lines of demarcation between these phases. Development is a continuum; and one phase will accordingly merge into the next without any perceptible transition. Even within each phase the situation will clearly not be static. Nevertheless, we believe that this division into successive phases is a useful conceptual device, for "on the average" the state of development, problems and needs of domestic contractors will be different in each phase, and the degree of emphasis put on various forms of development assistance will have to change accordingly. In Annex I to this report we have given a summary of the component elements of our proposed development program and of the changes we envisage in dealing with these elements over the entire time frame. In this connection we want to emphasize that we have not attempted to estimate the duration of the whole time frame since, as our field experience indicates, this is likely to vary considerably from country to country.

57. An assistance program launched in the "early phase" of the development will have to deal primarily with contractors with little or no, or at best limited, experience. This is not to say that all of those selected for the "development exercise" will necessarily all have the same backgrounds in terms of prior experience, education and technical or professional training. Some may be qualified to carry out only simple, conventional building; others may already be capable of more advanced types of building; and a few may have the professional and educational qualifications that enable them to carry out civil works of a relatively simple character and modest size. Some will probably be able to work initially only as subcontractors to resident or nonresident foreign contractors, while others will be capable of operating as prime contractors. They will all, however, be deficient in actual construction experience, financial resources and the ability to bear all the risks normally involved in construction. To this end, certain contracts and subcontracts of appropriate size and type would be reserved for them within defined price ceilings; intensive training and advice would be provided; the apportionment of risks and responsibilities between contractor and employer would be biased deliberately in favor of the contractor; and special financial assistance would be accorded from public funds. In this early phase contractors would already be screened

progressively for their development capacity on the basis of their cumulative performance record. In this phase the relative efficacy of various methods of development assistance would also be tested and revised in the light of experience. We estimate that this "early" phase might in most cases last about five years.

58. The "intermediate" phase is likely to be of rather indeterminate duration. In this phase a growing difference in the capacity of existing contractors would become evident. Some contractors might develop rather rapidly; others would be rather static; and still others would fall by the wayside. With suitable encouragement there might well be an increasing tendency of individual contractors to combine and form partnerships or companies. Some enterprises would probably develop to a stage where they could benefit from the formation of joint ventures with foreign firms. Within the limits imposed by the development of construction demand and to allow for attrition among existing contractors, new entrants into the "development group" would be admitted. Considering, however, that existing contractors would have presumably advanced beyond the "early phase" of development, the minimum educational qualification for new entrants into the construction industry might well be raised. Training and technical assistance would focus on existing contractors who had demonstrated a capacity for progress, and on new entrants; and the nature of this assistance would be adjusted to the stage of development and educational and occupational background of the contractor. Some of the responsibilities and risks which are normally borne by a contractor but which in the "early" period were shifted to the owner would during the "intermediate" stage be transferred to the contractor. The developing contractor would be exposed to certain risks of competition, but would be protected against the risks of excessively low bidding. He would be forced increasingly to turn to normal profit-making financial institutions for meeting his financial requirements, but to encourage these institutions to assume progressively the risks of such financing a government-sponsored fund might be set up to insure these institutions at first against a major, and subsequently against a declining, proportion of the credit risks.

59. In the "final" period domestic contractors would approach "maturity." They would be active in a wide range of construction activity, always within prevailing market constraints which might prevent the emergence of domestic contractors for highly complex and specialized construction work of which domestic contractors might not be capable or for which demand is not sufficiently large and continuous to warrant the development of domestic construction capability. During this period domestic contractors would be expected to achieve a capacity to operate under the same terms and conditions as foreign contractors and to shoulder the same risks and responsibilities. Special financial, training and technical assistance would be phased out.

60. The object of such an "exercise" in a developing country would be to develop domestic construction entrepreneurs and their "enterprises" over the different periods of the time frame into self-reliant contractors capable of capturing, by virtue of improvements in the quality and cost of their performance, an increasing share of the domestic construction market. While the program would concentrate on the development of domestic contractors, we do not rule out the possibility of including, in agreement with the government of a country where such a program might be launched, resident foreign contractors who can be assimilated to the status of domestic contractors on the basis of their "identification" with the country as evidenced by their intention to make that country their permanent home and whose capacity could be developed by the type of assistance provided by the program. Under such circumstances, however, this type of contractor might need less intensive training and technical assistance, and perhaps, less special financial assistance than the less experienced contractors of local nationality.

61. We do not want to imply that a development program should be launched always in the initial developmental phase of a domestic construction program. It might well begin in some cases in the intermediate phase. In such an event the program would consist of those measures that we consider appropriate for this phase.

62. In the preceding paragraphs we have referred to a time frame for the development of the construction industry as a whole. It should be pointed out, however, that new contractors will emerge in each of the phases of this time frame and that these will in turn undergo successive phases of development. The same may be true of groups of contractors engaged in different types of construction. Thus, within the time frame for the construction industry as a whole we may find, in the early phase, contractors primarily engaged in simple, conventional building operations; in the "intermediate" phase, an increasing number of contractors capable of complex building construction entailing elements similar to civil engineering, as well as civil engineering work; in the "late" phase, a balanced group of contractors capable of a broad range of construction work within the limitations of market demand. Separate time frames in terms of the nature of construction activity might exist (1) for simple, conventional building activity, and (2) for more complex building construction (multistorey construction and more complex factory buildings) and civil engineering work; and in the case the "early" period for the second might be more or less coterminous with the "intermediate" period of the first.

63. Over the whole time frame we would expect the domestic construction industry to increase progressively its share of the total construction market. One can roughly project the changes in the division of the total market among (1) domestic prime contractors, (2) joint foreign-domestic construction ventures, (3) resident foreign contractors, and (4) nonresident foreign contractors. Each of these types of

contractors could be expected to work increasingly with domestic sub-contractors. The share of the first could be expected to increase from the beginning. The second type of contractor might first emerge during the "intermediate" period when domestic contractors have reached a stage of development at which it might be advantageous to both the domestic contractor and the foreign contractor to form a joint venture to which each could make a contribution and in which there would be no undue risk that one partner would dominate the other; and the share of such joint ventures in the market might well continue to expand. The development of the share of the resident foreign contractor would be less easy to anticipate, since it will depend particularly on the relationship between the government and such contractors. The share of the nonresident foreign contractor will presumably diminish, beginning in the "intermediate" period; and the extent to which he shares his business with local sub-contractors will presumably increase. Even in the late period, however, the nonresident contractor will probably continue to play a role, as already indicated, in the execution of contracts entailing complex and specialized works. If total construction demand increases at a fairly rapid rate over the time frame, the diminishing share of foreign contractors in the total market will not, of course, be fully reflected in the absolute amount of business they will continue to carry out in the country.

F. Organization of the Report

64. Having outlined our basic approach to the development of domestic construction capability, we shall now proceed with a more detailed consideration of the various elements of a program which in our view are relevant to this development and which, for the most part, will have to be treated differently in the successive phases of the projected time frame. Chapter II, as already indicated, will deal with demand and supply, namely the projection and planning of construction demand on the one hand, and the appraisal of the existing and potential capacity of domestic contractors on the other hand. Chapter III will consider questions of project design, standards of construction and technology and their relevance to development. Chapter IV will deal with the possibilities of ensuring greater participation of domestic contractors in construction through appropriate division of work and methods of awarding contracts. Chapter V will discuss various aspects of contract execution in relation to the respective responsibilities of the employer and contractor. Chapter VI will deal with the educational, training and technical assistance inputs of a development program. Chapter VII will examine the contractor's requirements for various types of financing facilities and deal briefly with fiscal provisions relevant to development of the construction industry. Finally, Chapter VIII will discuss the advisability and methods of drawing up pilot development programs for selected countries and the role which the Bank Group and the government of these countries might play in framing and carrying out such programs.

CHAPTER II

ASSESSMENT AND PLANNING OF CONSTRUCTION DEMAND IN RELATION TO DOMESTIC CONSTRUCTION CAPACITY

A. Introduction

1. An examination made by Prof. Turin of the economic plans of more than 40 countries concluded that "very few of the development plans... single out the construction industry as one of the sectors for which targets are defined and whose relationship with other sectors of the economy is examined in detail." ^{1/} The Mission certainly found this to be true of the countries it visited. Only in Korea had an attempt been made to analyze the current five-year plan in terms of the volume and types of construction activity involved; and in this case we found the projections to be incomplete and difficult to relate to the construction which had taken place in the past. ^{2/}

2. A projection of the composition and total volume of construction demand is needed not only to indicate the ultimate limits within which a local construction industry can be developed, but also to assess the manpower requirements of the industry in terms of necessary training and educational facilities, and to determine the volume and types of building materials that may be required and the extent to which their production might be undertaken in various parts of the country in the light of economies of scale and transport costs.

B. The Assessment of Demand

3. Construction demand can usually be assessed in some detail only for the rather limited period, normally five years, covered by the country's general development plan. Even within this period demand can often not be readily forecast. Initially development plans are frequently drawn up only in macroeconomic terms, and their detailed content in the form of specific projects or groups of projects is determined only after a considerable lag and then only imperfectly even for the public sector. In the past project planning has tended to be sporadic, accelerating after a macroeconomic plan has been adopted and declining again with the approach of the end of the current development plan. Now, however, progressively

^{1/} Turin, The Construction Industry: Its Economic Significance and Its Role in Development, op. cit., p. B22.

^{2/} See paragraph 11 and Tables 4 and 8 of Appendix 1 in Vol. III of this report.

more attention is being paid to working out specific projects and programs, and if this trend continues and becomes more independent of the duration of any particular planning period, it should provide a better basis for the determination of future construction demand.

4. A breakdown of construction demand by types of projects and of construction activities can probably be made only for the comparatively short period for which detailed planning can be undertaken with some degree of confidence. For longer periods it should be possible, as a minimum, to project aggregate demand in relation to the anticipated growth in gross domestic product. A study of the experience of a large number of developed and developing countries has shown that gross fixed capital formation and value added by construction are closely correlated with the rise in gross domestic product per capita.^{1/} Thus, if the latter can be projected on the basis of the past trends and future prospects of the economy, the rate at which construction demand is likely to develop can also be determined. Within this global projection, the approximate share of building and civil works can also be forecast on the basis of past experience, though with a lesser degree of accuracy.

5. By no means all of the projected volume of construction will represent effective demand for the services of the organized construction industry defined in terms of all the construction enterprises active or likely to be active in the country. To arrive at effective demand, construction in the subsistence sector must first of all be disregarded. In Ethiopia, for example, this was estimated to have been almost 27% of total construction in the three-year period 1967-1969. Secondly, that part of residential construction undertaken by prospective home owners acting as their own contractors should be eliminated. While giving employment to artisans and groups of artisans, it does not really provide work for construction enterprises. In Korea, Iran and Ethiopia the major part of housing demand is met in this way, and the contracting industry by and large undertakes the construction only of apartment houses and large housing complexes. Finally, the construction work normally carried out by government and government agencies themselves should not be included in effective demand. In Ethiopia a considerable, though apparently diminishing, volume of new construction has in the past been done by public authorities on their own account. In cases of this type, however, it would be desirable for public agencies to consider carefully to what extent a transfer of construction to the private sector might result in a reduction of costs, and give greater scope for the development of a private domestic construction industry.

^{1/} See Construction and Development: A Framework for Research and Action (London University College, Environmental Research Group, Building Economics Research Unit, May 1972).

6. Construction should as far as possible be disaggregated into various types classified in accordance with the demands they make on the technical and managerial capacity and on the financial resources of contractors. Large or complex construction projects will need to be identified separately whenever these are beyond the capacity of the domestic industry, although it may be possible in such cases to segregate elements of such projects which, by virtue of their size or relative simplicity, can be carried out by domestic contractors or subcontractors. As a minimum, a distinction should be made between building on the one hand and civil works on the other hand. Building generally requires little equipment and therefore little investment. Much of the building demand consists of simple, small, and in geographic terms, widely distributed projects which provide numerous opportunities for domestic enterprise and make relatively modest demands on technical and managerial skills. Civil works, on the other hand, usually entail the use of much more equipment and therefore require contractors capable of mobilizing the requisite capital and marshalling the skills needed to operate and maintain such equipment. Their execution often demands an ability to deal with technical problems wider in range and more complex in character than those encountered generally in building. The average size of civil works contracts is substantially bigger than in the case of building, and this factor, coupled with the need for more plant and equipment, makes it necessary for prime contractors in this field to command a larger organization, better management and greater financial resources. The larger scale of operations involved in civil works are likely to make market constraints a more serious limitation on the number of contractors that can be developed in this field. In many small developing countries the aggregate demand for civil works is likely to be very small in relation to the number of prime contractors that can be kept more or less continuously employed, and much of this demand may consist of a comparatively few major projects the completion of which may result in an abrupt decline in demand. In Ethiopia we found the total annual demand for civil works construction was only about US\$30-40 million. It is obvious that in a market of this size the opportunities for the development of domestic civil works capacity are rather severely limited. In contrast, the volume of civil works construction in Korea amounted to almost US\$610 million in the year 1970.

7. In assessing demand, it is important, however, to go beyond a simple classification into building and civil works. In each of these fields there is a range of construction activities with widely varying demands on technical and managerial capacity. In building a distinction should be made between: (1) one and two storey structures with load-bearing walls and simple foundations; and (2) multistorey buildings using a structural framework of steel or reinforced concrete and involving excavation and more complex foundation work. Even in the first of these two subcategories the contractor who can build structures designed to serve simply as shelters for housing, for offices, for goods or for light machinery used in manufacturing often does not have the capacity to construct luxury or semi-luxury houses with more complex wall systems and higher-grade finishes and fittings, or single storey factories and stores which must have overhead facilities for the transmission of power or the conveyance of goods and materials.

8. In civil works, construction demand is often broken down into road construction, irrigation and land reclamation, dam construction, power transmission, water supply and sewerage, airport and harbor facilities, etc. While each of these fields undoubtedly calls for certain special skills and techniques, this breakdown is not in all respects meaningful. Certain types of work such as excavation and earth-moving may be common to many of them. In each there is usually some work which can be carried out by contractors and subcontractors with limited means or of relatively unsophisticated skills. In road works there is obviously a great difference in the demands placed on the contractors between the construction of a new high-standard road involving many difficult operations such as rock cutting and rock excavation and the construction of complete pavements on the one hand, and the upgrading of an existing road involving shaping and compaction of a relatively simple embankment and a topping of gravel.

9. In general civil works can offer opportunities for the development of a considerable number of small contractors or subcontractors who are capable, without possessing high technical qualifications, of constructing small bridges and drainage structures and carrying out simple earth-moving jobs. In Iran particularly we were impressed with the large number of small subcontractors who, starting originally as skilled or semi-skilled equipment operators and maintenance men, had acquired bulldozers and dump trucks and were doing, apparently quite efficiently, much of the earth-moving work for prime contractors.

C. Planning of Construction

10. Attention should focus not only on the assessment of construction demand, but also on the planning of such demand. A study prepared by UNIDO stressed the importance of such planning in these terms: "Construction, instead of being a haphazard operation, must be the subject of conscious rational programming, in respect to both demand and supply, within the framework of the economic plans of the developing countries. Public investment (dams, irrigation schemes, transport systems, large industrial and residential projects, etc.) must be carried out on the basis of long-term programming. Construction objectives should be coordinated with the planning of the supply of materials. Public investment has to be carefully dovetailed with private investment, not only to ensure continuous activity within the construction industry itself, but also to ensure harmony with the desired levels of regional and local economic activity. ^{1/}

^{1/} Construction Industry (Monograph No. 2, UNIDO Monographs on Industrial Development, United Nations, New York 1969), p. 81.

11. In Chapter I we have already stressed the importance of stability and continuity of work volume to the development of the construction industry. The possibilities of improved phasing to achieve this objective merit serious examination. Planning is also necessary to determine how large construction projects and programs can be divided into jobs of varying sizes and degrees of complexity in such a manner as to maximize the opportunities available to domestic enterprises to participate in their construction either as prime contractors or as subcontractors. In Chapter IV we shall examine how and within what limits this might be done.

12. We are not, of course, suggesting that the phasing of the construction work included in development plans be dictated by the requirements of the construction industry, but simply that the latter's needs be considered as one of the factors in determining when projects are to be started and completed. The economic need of a project, and its relationship to other projects that may contribute to the satisfaction of this need, will generally be the principal, if not the sole, factor in deciding the construction schedule. The benefits foregone if a project is delayed (or, conversely, the cost of locking up capital in a project which is completed too soon in relation to other elements which are essential to the realization of its economic benefits) must always be considered. However, there are circumstances which may make it possible to change the timing of construction projects without serious economic disadvantages. Sometimes, for instance, it may not make much difference whether a road is completed one or two years later or earlier, particularly when the projected benefits accrue over a long period and most of these are likely to develop in the later stages of the life of the project after a substantial increase in traffic is generated. Moreover, the timing of many projects in developing countries is often determined not so much by economic requirements, as by other considerations and purely adventitious circumstances. In Korea, for example, we found that the construction schedule of the largest and most important road project - the Seoul-Pusan express highway - was strongly influenced by considerations of national prestige and that the compression of construction within a comparatively short period had necessitated heavy additional investments in equipment which proved difficult to amortize.

13. The usual practice of planning within five-year time frames has often led to the "bunching" of project starts in the middle years of the plan and in a decline of new commitments toward the end of the old, and at the beginning of the new, planning period. The start of a new project may be dictated simply by the completion of all the preparatory planning work. For example, if and when the feasibility studies, designs and specifications for all the projects in a five-year road program are finished, all of the necessary construction work may be put out to tender and awarded within a short period even though the phasing of construction starts over a longer period may economize on the use of equipment and facilitate greater participation by domestic construction firms.

14. By and large, considerable improvements in the planning and phasing of construction work can probably be made without adversely affecting economic development. In countries where development projects are heavily dependent on external financing, efforts to make such improvements can generally be carried out only in cooperation with the agencies providing such financing. Construction required for particular sector programs may be especially well suited to such cooperative planning. In Chapter V and Annex II we have shown, in the form of an illustrative model, how a five-year road construction program might be planned as a proving ground for domestic contractors and under conditions that would ensure continuity of work and minimize the amount of investment participating contractors would require.

D. Supply: Number and Capacity of Domestic Contractors

15. In our discussion of the assessment and planning of construction demand we have already stressed the importance of identifying, by type and amount, the construction work that is likely to be suited to the capacity of domestic contractors. The determination of this capacity, to which we now turn, is undoubtedly very difficult. Equipment, however important in carrying out specific civil works projects, can hardly be regarded as a critical determinant of the capacity of contractors. Capacity is determined rather by the entrepreneurial talent, managerial and technical skills, and experience of the existing and "would-be" contractors, and these factors are difficult to quantify in terms of a given volume and type of work. Moreover, capacity so defined will undergo continuing changes in a developing situation.

Criteria for Assessing Contractors' Capacity and Potential

16. For existing contractors the best yardstick for measuring capacity is past performance. An adequate record of past performance can help to answer many relevant questions. What type of construction work has the contractor carried out? What is the maximum volume of work he has handled, and how many contracts has he been able to carry out at one time? Has he been able to complete contracts on time, and has the quality of his work been questioned at the time of the provisional or final acceptance of the construction jobs for which he was responsible? Above all, what does the record of his performance over time show about his capacity to make progress in terms of the types and volume of work of which he is capable, the timely completion of contracts, the quality of his work and his ability to increase his staff and his financial resources and creditworthiness? Satisfactory answers to all these questions can only be given, of course, if the appropriate agency of the government has taken steps to establish and maintain the necessary records on contractors' performance. The importance of this to the continuing process of contractor selection can hardly be overemphasized.

17. The most difficult problems arise in connection with the selection and the assessment of the potential capacity of those who want to become contractors but who have no previous experience in contracting. Since the number of such individuals is likely to be considerable despite the risks involved in the construction business, it is important to develop and apply some criteria to screen such applicants. For this purpose it is necessary to determine what qualifications new entrants into the construction industry should possess and what methods can be used to establish whether or not the applicant possesses these qualifications. We have listed these qualifications in Annex I under heading I and we shall attempt to outline below the tests that might be applied:

a) Motivation - By motivation we mean the degree of commitment by the "would-be" entrepreneur and his capacity to think in terms of concrete personal goals and of objectives for achieving his goals. Commitment can be tested in various ways - for example, by his willingness to risk a certain amount of capital which, while not large in absolute terms, is still significant in terms of whatever resources he does possess; and also by his willingness to give undivided attention to the new business he proposes to undertake. New methods for testing, and perhaps even developing, achievement motivation have been developed by Prof. David C. McClelland and his associates at the Behavioral Science Center of Harvard University.^{1/} These employ a variety of means - competitive games, simulations, case studies, group discussions, tests and questionnaires - to bring out and promote an understanding of behavior under given situations, to clarify and define motivations and to appreciate the factors conditioning achievement. Such techniques, while by no means fool-proof, have been tested sufficiently to warrant the conclusion that they can be helpful in determining whether individuals do have the commitment essential to success in business.

b) Entrepreneurial skill - Entrepreneurial talent we would define as the ability to assess and take risks, to innovate in terms of responsiveness to new opportunities and new methods, and to organize and plan the factors of production. This entrepreneurial capacity is difficult to assess. Where an individual has previously engaged in business, his record of performance in that business may well be the critical test. In other cases in-depth interviews with the individual may be a useful device of testing his responsiveness and his appreciation of the risks involved in contracting. The techniques for assessing motivation which have been mentioned will also help in discerning talent for entrepreneurship.

^{1/} See David C. McClelland and David G. Winter, Motivating Economic Achievement (The Free Press, New York, 1971). A brief summary of the techniques employed is given in John C. de Wilde, The Development of African Private Enterprise (IBRD, December 10, 1971), Vol. I, p. 40.

c) Educational qualifications - The degree of formal education that should be required will depend on (1) the general educational level in the country, (2) the education of already existing contractors with whom the new entrant into construction will have to compete, and (3) the type of construction work for which the new contractor wants to qualify. While relatively uneducated individuals of great energy, entrepreneurial skill and managerial talent can and do succeed in the construction business, the chances of success are likely to be considerably greater for individuals who have the formal education that enables them more readily to achieve the ability to calculate costs, to understand specifications and drawings, to keep or supervise accounts and to deal with financial problems. In a country like Kenya, where the general educational level is still rather low, one probably cannot, however, expect the small building contractor to have very high educational qualifications. On the other hand, where a considerable number of existing contractors have had the benefit of a certain amount of formal education, it would probably be a mistake to admit new entrants with lower educational qualifications. An individual who expects to qualify as a small contractor undertaking simple conventional building projects can presumably manage with less education than an individual who wants to qualify for civil works which demand considerably greater technical and managerial skills. Civil works contractors, except those qualified to work only, in essence, as labor contractors or as small earth-moving contractors, should generally as a minimum be expected to have a secondary education.

d) Technical and professional qualifications - Such qualifications will not invariably be necessary. A businessman-entrepreneur can become a successful contractor capable of hiring the necessary technical or professional personnel. However, an individual who has neither the technical qualifications, nor a record of success in some business other than contracting, is unlikely to prove successful. Some technical or professional qualification should be demanded of the individual without significant relevant business experience. For the small building contractor demonstration of experience as a competent building artisan may be sufficient. The individual who aspires to be qualified for modern building or civil works will, in the other hand, need to be a technician or engineer. If there are already a considerable number of domestic contractors active in these fields, additional qualifications can be demanded of new entrants, particularly in the form of prior experience as employees of existing construction or consulting engineering firms or in government as inspectors or supervisors of construction.

18. One can expect that the application of various methods for testing the qualifications of new entrants into construction will at best somewhat reduce the potential risks of failure. However, some control should be exercised on the number of new individuals or firms permitted to enter the construction industry. Otherwise there is a tendency, as we observed in the countries we visited, for the industry to become overcrowded and characterized by a high rate of failure. A limitation of numbers is all the more necessary if new contractors are to enjoy special developmental help in the form of training, advisory and financial assistance. The

experience of the NCC in Kenya shows that such help can be effective only if it can focus continuously on a limited number of contractors. Once new individuals or firms are admitted, continuous screening on the basis of their cumulative performance record and their response to advice and training becomes critically important. Performance on a few contracts will not necessarily be relevant because, owing to the nature of the construction business, this may well be affected by adventitious factors over which the contractor has little or no control. However, the contractor's performance over a series of contracts should demonstrate whether or not he has the capacity for growth.

19. It is important to keep in mind that these potentialities for growth will vary with the qualifications of the contractor. It is doubtful, for example, that the kind of contractors whom we found in Kenya and who in most cases have extremely modest technical and educational qualifications will for the most part develop a capacity to undertake any construction work other than the conventional building operations in which they are already engaged. They could, however, be assisted to expand their volume of business, reduce their costs and improve the quality of their work. On the other hand, some of the Ethiopian firms started in recent years by civil engineers might, with appropriate assistance, be enabled to extend the scope of their operations from building to civil works and to undertake works of progressively greater size and complexity.

E. Collection of Data on Construction

20. If there is to be an effective and continuing assessment and planning of construction demand in relation to the actual and potential capacity of the domestic construction industry, a considerable effort must be made to remedy current deficiencies in data.

21. On the demand side records should be kept on the total number and value of contracts awarded, classified by (a) size of contract, (b) type of building (residential, commercial, industrial and public; single storey and multistorey) and civil works (roads, bridges, ports and harbors, irrigation and land reclamation etc.), and (c) type of contractor (domestic, resident foreign, and nonresident foreign). Public sector authorities should be expected to report the contracts they award, and registered contractors could be required to report contracts awarded to them by the private sector. The public agency responsible for development planning should issue instructions that the construction component of projects and sector programs included in the development plan be segregated, and should also try to project construction demand over a period longer than the duration of the current economic plan. The agency charged with the preparation of national accounts should seek to determine cost breakdowns for representative samples of contracts reported in order to develop a more reliable basis for estimating value added by construction.

22. On the supply side comprehensive records should be maintained for each contractor so that his progress could be quickly evaluated and his classification revised in accordance with performance. For public contracts records should be kept to facilitate a comparison of the original cost estimates prepared by or for the public agencies which let the contract, the price at which the contract was awarded, and the price at which the contract was completed. The factors responsible for any adjustments in the original price of the contract should as far as possible be identified. Progressively comprehensive information should be developed both on the prices tendered for various items in construction contracts and on actual prices and costs in such way as to facilitate improvements in the estimation and control of costs and to permit the construction of cost indices that might be used in making adjustments for escalation in the prices of labor and materials.

CHAPTER III

DESIGNS, PLANS, SPECIFICATIONS AND TECHNOLOGY

A. The Relevance of Design

1. Design is the first stage in the realization of a construction project; and the design of the project largely determines whether or not domestic contractors are capable of carrying it out. The approach of the design engineer and architect to their task can either inhibit or promote the growth of an indigenous contracting industry. If the encouragement of this industry is a government objective, then the engineer and architect must keep in mind the need to adapt their designs as far as possible to the capabilities of developing domestic contractors. In a sense the design engineer and architect should play the role of educators to such contractors, not demanding more than the latter's current performance makes possible but introducing, as their capacity grows, design standards requiring more advanced construction techniques. The design and specification writer can and should initiate advances in techniques, but only after the old ones have been effectively mastered.

2. We obviously are not suggesting that all projects be designed to bring them within the capacity of the local industry. At any particular stage of the development of a domestic construction industry there will manifestly be projects that are too large or too sophisticated for domestic contractors. But where an alternative design of the project may bring it within the competence of such contractors, this alternative should certainly be seriously considered. Any design should, of course, be compatible with the basic purpose that the project is to serve, and the comparative costs of alternative designs must be taken into account.

3. Since the purpose of the project is likely to govern the design, the requirements that must be met in this respect should be carefully considered. "Overdesign" in relation to requirements may not only increase costs unnecessarily but also lead to the prescription of standards of construction that are beyond the capability of domestic contractors. When a simple gravel road will economically serve the needs of the project, growth in traffic, it would obviously be undesirable to construct a road with an asphalt concrete or Portland cement wearing course that would normally require the use of much more costly and sophisticated equipment and entail far greater skill in the manufacture and laying down of the materials.

Value Engineering

4. The concept of "value engineering" seems to us to be particularly important in this connection. Value engineering is concerned with the choice, among a number of alternatives, of the most economical means of achieving a determined objective. It seeks to determine the level of design and the degree of perfection in execution that is most appropriate in the

light of a country's capacity to support the costs of construction involved; and in this process it assesses the marginal cost of raising standards and degree of perfection in relation to their marginal value. For instance, with an insistence on a progressively higher degree of perfection, the marginal cost of achieving perfection will tend to go up rapidly while the marginal value of progressive steps toward perfection will diminish. The point where the curves depicting the development of such marginal costs and values intersect will thus determine the optimum degree of perfection for which a project should be designed. When housing is to be provided as a basic shelter for large numbers of people in a poor country, the design should not provide for complex wall systems and expensive installations which would only have the effect of reducing the number of units that the country could afford. Nor should there be an insistence, in the course of construction, that the walls be absolutely plumb and the floors perfectly level, for this might well entail marginal costs out of proportion to the marginal value of such precision. Moreover, the higher design standard and the insistence on precision might together operate to disqualify many domestic contractors from participating in the construction.

5. Value engineering is also concerned with the appropriate design of a project in terms of both its life and its ability to meet peak demands. In a country where capital is scarce and therefore costly, the capital investment required can be considerably reduced by designing the project for a shorter life. Under such circumstances a road with low-standard of pavement designed to fail after a relatively limited number of years may prove more economic, even after taking into account recurring maintenance costs, than a road with a high standard of pavement designed to last a long time. When the real cost of capital is high the present value of the "distant" benefits of a long-life project may well be negligible or nil. The cost and value of meeting the peak demands that may be made on a project also need to be carefully weighed. A project may or may not be designed to meet such contingencies as extraordinary floods or earthquakes or to meet peak demands for water, transport or any other need that it is to serve. The cost and value of the extra features of project design that will be needed to cope with such demands and emergencies will then have to be examined. All these factors will affect decisions on standards of construction which in turn may have an important bearing on the capacity of the domestic construction industry to carry out the project.

B. Appropriate Technologies

6. It is undoubtedly important to devise a construction technology appropriate to the conditions in each country. Construction technology can be defined in terms of the amount, cost and sophistication of tools

and equipment employed and of the demands made on technical and managerial skills. A technology may be "appropriate" in economic terms, in the sense that it results in an optimum relationship of costs to benefits, or in terms of its suitability to the skills of local entrepreneurs and labor. These criteria for determining an appropriate technology will often be difficult to reconcile.

7. The Mission did not consider in detail the factors determining an appropriate combination of equipment and labor in the light of the relative economic costs of the factors of production, since this is the subject of another IBRD study.^{1/} Such combinations can, of course, range from manual labor employing only a few hand implements at one extreme to the use of the most advanced and productive equipment with little labor at the other extreme. In theory it is possible to achieve high standards of construction without the use of much equipment. However, the use of machinery has important advantages. With machinery work of a higher degree of uniformity and with smaller tolerance can be achieved. The work can also be completed more rapidly, thus reducing the cost of interim financing required, diminishing the risk of the exposure of the incompleting work to damage by natural elements or to inflationary increases in costs, and permitting an earlier realization of the benefits of the project. Finally, the introduction of a new technology may be a challenge and stimulus to the development of managerial and technical skills.

8. With appropriate economic pricing of the factors of production it is possible in theory to determine the combination of labor and equipment that will yield the lowest possible cost of construction. However, when this involves the use of a considerable amount of expensive equipment, costs will be significantly affected by the efficiency with which this equipment can in practice be used, and particularly by the extent it can be fully employed during its entire life.

9. The construction technology that is adapted to the limited capacity of developing local contractors may not always be the lowest-cost technology. It is necessary, among other things, to compare the advantages and disadvantages of (a) investing in equipment of different capacities for doing the same work, and (b) investing in equipment capable, with appropriate attachments, of performing a wide variety of the tasks on the one hand, or in various types of specialized equipment, each capable of performing one of these tasks very efficiently but incapable of other work, on the other hand.

^{1/} See C.G. Harral et. al., Study of the Substitution of Labor for Equipment in Road Construction - Phase I: Final Report (IBRD, 1971).

10. The relationship between design and technology can be illustrated by an example. An optimal bridge design is usually one in which the superstructure costs (less the cost of pavement and sidewalks) equals the substructure costs. However, the bridge can be designed with shorter than optimal spans in order to take into account a contractor's limited capacity to construct, hoist and erect the necessary superstructure. In that event additional piers that will tend to raise total cost will be necessary. In any such case, therefore, the adjustment of technology to the capability of contractors could entail extra costs which would have to be weighed against the eventual benefits of developing a domestic construction industry.

Evolution of Technology

11. Technology and the related design concepts will need to evolve with the growing capabilities of domestic contractors. In the initial development phase efforts may well have to be concentrated almost entirely on the more efficient application of tools, materials and methods which such contractors are already using. For example, if bricks and concrete blocks are readily available and local contractors and laborers are familiar with masonry crafts, building projects might well be designed around the use of these materials and skills rather than around the use of unfamiliar substitutes. One of the authors of this report once noted, during a visit to the Malagasy Republic, that a skilled indigenous building industry had developed there in the past on the basis of locally-manufactured bricks, but that the recent, comparatively sudden, introduction of new imported building materials and the associated construction techniques had led to a rapid decline of the local industry and the craft skills it utilized.

12. However, when improvements in existing tools, skills and materials yield progressively diminishing returns, new technologies, involving more advanced design concepts, management and construction techniques and the use of new types of equipment and materials, should be progressively introduced. Throughout this process the designer and specification writer will need to be familiar with the capacity of the domestic contractor and the rate at which he is advancing so that they can discern when it will be appropriate to introduce him to new technologies.

C. Drawings and Specifications

13. The appropriate method of handling contract drawings and specifications will now be considered. Contract drawings tell the contractor in diagrammatic form what needs to be built and the shape, size, dimensions and relationship of the physical components of the construction work. The contract specifications give the detailed requirements with respect to materials and methods of construction.

Method and End-Result Specifications

14. Specifications can be written in either of two forms or a combination of both. The first form is the method specification. It provides the contractor with detailed directions on how to do the work. For example, in the case of concrete, the specification spells out the recipe (i.e. the number of sacks of cement, the number of pounds of coarse aggregate, the number of pounds of fine aggregate, the number of gallons of water and the amount of admixture, if any). The method specification also describes at length the chemical and physical composition of each of the ingredients and then goes on to prescribe how the ingredients should be combined, transported, and placed into the formwork. The method specification continues with the description of the tools and methods that should be used to finish and treat the concrete. The second type is the end-result specification. It is relatively silent about most of the aforementioned details but emphasizes, instead, the salient attributes of the finished product. Thus, to use concrete again as an example, the end-result specification requires that the concrete should, after a certain period - usually 28 days after it has been installed, conform to designated standards with respect to: (1) compressive and flexural strength; (2) porosity as measured by the amount of water that a dried specimen of concrete will absorb; and (3) resistance to wear as measured by abrasion tests and wetting and drying cycles or freezing and thawing cycles and so forth. Such end-result specifications leave the means of achieving these standards to the contractor.

15. Domestic contractors in the early development phase will not possess the necessary engineering or construction skills required to cope with end-result specifications. The method specification will be more appropriate. It will give the employer greater assurance of an acceptable finished product and provide the developing contractor with indispensable guidance in proper construction methods. It will not only help to ensure construction of uniform quality, but also give the employer's supervising engineer a greater degree of control and the right to monitor the construction process from inception to completion.

16. While properly prepared method specifications should, in principle, achieve the desired end-results, we realize that all too frequently this does not happen in practice. It is therefore usually the custom, even where method specifications are provided, to hold the contractor accountable for the end-result. We doubt, however, that the neophyte contractor should be expected to assume the obligation for producing according to end-result expectations in the early phase of his development. The method specification which guides his work and is, in essence, a manual of instruction on the best

construction methods, implicitly assures such a contractor that, as long as he follows these detailed instructions, he has performed his contractual obligations satisfactorily. If there is any doubt in the engineer's and the designer's mind that this will indeed be the case, adequate provision can be made in the plans and in the specifications to cover this possibility. For example, if the engineer is concerned that the method specification for concrete may not yield the required compressive strength of 3,000 lb per square inch because of the general inefficiencies inherent in the neophyte contractor's operations, then the specification writer should increase the cement content by, say, one sack of cement per cubic yard. While this may raise the cost of concrete by about US\$1.50 per cubic yard, it will provide additional insurance that the neophyte contractor working under a method specification will achieve the desired end-result.

17. To sum up, we consider that method specifications should be used in the early and intermediate phases of the development program and in many cases even into the late phase of the development program. End-result specifications should not be introduced until the latter part of the intermediate phase of the development program and even then in combination with the method specification. The responsibility for achieving end-results should initially be assumed by the employer, but as the development program progresses through the intermediate phase, this obligation should increasingly be transferred to the contractor. It should be noted that in the United States, where method specifications are widely used but where contract terms make the contractor also responsible for failure to achieve the end-result, the courts have frequently ruled that, notwithstanding the provisions of the contract, the contractor is not liable for the achievement of the desired end-results.

Simplification of Specifications

18. If domestic contractors are to be effectively developed, it is important that design drawings, specifications and the accompanying bills of quantities be simplified and standardized as far as possible. In the countries visited we frequently noted that even for more or less identical projects there was often a lack of uniformity in the specifications and a resulting absence of uniformity in the bills of quantities. Every consulting engineer has a tendency to develop his own specifications format, and even when the same firm is engaged in designing successive extensions of the same project specifications may be altered as different project managers or specification writers are employed. In design drawings simplification can be most readily achieved by adopting standard details wherever possible. The more standardization, the more repetition. The more repetition, the more efficacious is the learning process. This uniformity should extend not only to sizes, shapes, materials and methods of construction, but also to the design of the major components of the structure itself.

19. Appropriate examples of design standardization can be cited. One relates to the design of storm sewers. This remains basically an empirical art. In the United States and in Western Europe, the design of pipe culverts remains grossly imperfect despite the existence of voluminous historical records relating to rainfall, snow melt and run-off. To design pipe culverts for a remote part of an underdeveloped country where relevant data on run-off are lacking or undependable is an incomparably more difficult task. Under these conditions it may prove to be almost useless to specify in a highway construction job the use of pipe culverts of different capacities ranging from 12" in diameter to 60" in diameter. In other words, instead of designing for 12", 18", 24" and 30" concrete pipe, it might be more advantageous to standardize around, say, 24" diameter pipe and use multiple culverts when increased capacity is desired. Similar design simplifications are probably applicable to box culverts, minor bridges and retaining walls. The reinforcing steel required might also be standardized. It is commonly used in sizes ranging from 3/8" diameter to 1 1/2" diameter (#3 bars through #12 bars). However, in designing a minor bridge it might be better to require the use of reinforcing bars of a uniform diameter (say, 5/8") than to specify the use of various sizes ranging from #3 bars to #9 bars. Similar possibilities for standardization should be explored in the building industry. For instance, doors and windows might well be standardized.

Role of Drawings in Contractor Development

20. In the early phase of a contractor development program, it is important that the contract drawings furnished to the contractor should not only clearly delineate the entire facility in its finished form, but should also show pertinent details of every step in the operation and include detailed designs of any temporary work that may be necessary. For example, an indigenous contractor who undertakes, in the early development phase, to construct a small bridge cannot be expected to devise an economical forming system for the concrete work. The contract drawings should therefore give him the complete designs for the concrete forming system. Similarly, when reinforcing steel is to be used, the drawings furnished to the contractor should include detailed bar bending schedules and setting plans. The importance of providing the neophyte contractor with adequate guidance in the design of temporary work was strikingly demonstrated by an example we observed in Kenya. There we found a contractor using a shuttering system for a concrete floor slab that was so overdesigned that the shuttering system itself could have been used as a floor! In this case there was no one to point out his mistake and to show him how the work might have been more economically carried out. He would have learned how to do this job properly had the contract drawings shown him how to construct a better shuttering system.

21. The responsibility for project designs and drawings should almost always be vested in the employer and his staff, or in his appointed agents such as consulting engineering firms. However, as the contractor progresses through the various phases of a development program he should be

encouraged and expected to innovate and develop his own construction techniques and designs for temporary work except, perhaps, for the more complicated construction processes such as trench supports for deep excavations and cofferdams in deep water. In the late phase he should develop considerable inhouse designing capacity. In Korea, where the construction industry is already rapidly approaching the late phase of development, we found that a number of large Korean contractors already had a sizeable staff of engineers capable of design work. Firms participating in the construction of a new subway system for Seoul by the cut-and-cover method had themselves designed the heavy sheeting and bracing system necessary to support the deep excavations and to permit the continued movement of the heavy traffic in the streets above. Even in Korea, however, we found the indigenous capacity for overall project design still very limited.

CHAPTER IV

METHODS OF DIVIDING CONSTRUCTION
WORK AND AWARDING CONTRACTS

1. In the last chapter we discussed the relevance of design, drawings and specifications to contractor development. In this chapter we shall show how the construction work might be divided into various types of prime contracts and subcontracts and then awarded in a manner that would effectively promote the domestic construction industry.

A. The Division of Work into Contracts and Subcontracts

2. The work involved in carrying out a single project or a construction program may be divided horizontally and vertically. The opportunities for such vertical and horizontal division or "slicing" are outlined under Item A of Subject V in Annex I of this report. In building, vertical slicing will be possible only in the case of programs calling for the construction of a number of discrete units each of which can be used by itself. Instances are programs for the construction of a number of schools or separate housing units. Such construction programs might be awarded to a single contractor or, at the other extreme, to a number of contractors equal to the number of units to be built. Individual building projects can only be divided horizontally to segregate the type of work that might be subcontracted by the prime contractor for the building as a whole. In simple conventional building projects the opportunities for such subcontracting are rather limited, but in large modern buildings they can be numerous, covering such items as site work, structural work, roofing, drainage, plumbing, electrical work, heating, ventilation and air-conditioning, vertical transportation etc. Subcontractors for such work may themselves subcontract parts of their jobs. In civil works both vertical and horizontal slicing are possible. Road construction programs can be divided into a number of projects each of which could be completed and used independent of the others: and each road can be segmented in stretches which can be entrusted to separate contractors but which cannot be effectively or fully used until they are all completed. The work on each road can also be horizontally divided into a number of sequential operations ranging from clearing and grubbing to the final laying of a wearing course and including the installation of drainage facilities and construction of bridges. Each of these may, at least in theory, be the subject of separate prime contracts or subcontracts.

3. Construction work may also be divided over time. For instance, the contracts under a particular school building or road building program may all be let more or less simultaneously or may be phased over a longer period of time. In the first case a larger number of contractors may be necessary; in the second case fewer contractors will be needed and thus may have the opportunity of carrying out several consecutive jobs included in the same program.

4. If a government is committed to the promotion of domestic contractors, it will need to give considerable attention to appropriate and feasible ways of dividing public sector construction work into contracts and subcontracts classified by size and degree of complexity so as to increase the opportunities for participation by domestic enterprises. The extent to which this can be done will, of course, be governed by a number of constraints which we shall examine later in this chapter. Here we will first consider how this division of work might be influenced by the way in which the pattern and structure of a domestic industry can be expected to develop.

Division of Work in Relation to Contractors' Capacity

5. In the early stages of the development of a construction industry, domestic contractors will be primarily capable of simple projects or types of work that can be carried out more or less economically with a low-level technology. Examples of the type of work that they can do would include repair and maintenance of existing facilities, construction of simple farm-to-market roads without high-standard pavements, and conventional building such as single storey houses and similar commercial industrial and institutional structures. Domestic enterprises would presumably be unable to undertake, as prime or general contractors, the construction of modern buildings that are structurally framed and call for more or less complex wall and roof systems. They should, however, have opportunities to work as subcontractors responsible for roofing, glazing, carpentry and mill-work, painting and decorating, tiling and other similar jobs. In Kenya, for instance, the National Construction Company is giving attention to the development not only of general building contractors, but also of specialty subcontractors capable of installing electrical and plumbing systems.

6. In the early phase of development, domestic contractors will presumably be unable to build high standard highways. These usually call for a horizontal and vertical alignment which necessitate a large volume of earthwork and rock excavation and for advanced pavements involving the production and laying of Portland cement concrete or hot asphalt concrete. In view of the skills and the considerable amount of equipment required, domestic contractors are unlikely to develop the capacity for such work until well into the intermediate phase of our time frame for the development of the domestic construction industry. Nevertheless, there will be certain types of work for which a domestic construction capability can be developed, particularly in the form of subcontracting. Local contractors or subcontractors can be qualified for the construction of small bridges and the installation of pipe and box culverts. The experience of Iran demonstrates the feasibility of developing small enterprises to which simple earth-excitation and movement and the transport of materials can be subcontracted. It may be possible also to develop local entrepreneurs specialized in drilling, blasting and stone crushing.

7. In the early and intermediate phase there are likely to be a growing number of entrepreneurs operating as subcontractors, either to foreign prime contractors or to more or less experienced domestic contractors. Though there will obviously be a permanent and even growing need for specialized subcontractors as the construction market develops, a number of subcontractors will develop into prime contractors or general contractors. Some of these will in turn enter into joint ventures with foreign firms. This development, however, is unlikely to take place before the intermediate phase of development. As we have already indicated in Chapter I, such a partnership can hardly thrive except on the basis of equality. Each party will have to be able to contribute something of value. The local partner, once he has gained experience, may contribute an intimate knowledge of local conditions, including the ability to deal with local labor and suppliers of materials and to handle relations with the government, while the foreign partner may provide needed technical and managerial skills and financing. Such a joint venture might initially be formed to carry out a particular construction project but might later be transformed into joint companies, committing the partners to a more permanent, continuing business enterprise.

8. As domestic contractors go from the intermediate into the final phase of development, they will presumably be capable of a progressively broader range and also more specialized types of construction work. In the final phase we anticipate that it will no longer be necessary for the government to make special efforts to divide construction work for the special purpose of providing more opportunities for domestic contractors. Apart from sharing in joint ventures with local firms, foreign contractors will probably still be active in several capacities. On some projects they may in essence act only as construction managers, "orchestrating" the activities of many local subcontractors. In other cases they will still be required to carry out work which is extremely specialized or very complex or for which there is not sufficient continuing demand to warrant the development of local construction capability.

Measures to Develop Subcontractors

9. In view of the potential importance of subcontracting in the progressive evolution of a domestic construction industry, the development of this type of enterprise merits special consideration. In particular, subcontractors to foreign firms, as indeed domestic partners in joint ventures with such firms, can gain much practical experience from their association with foreign contractors. One must reckon, however, with certain obstacles to the development of subcontracting. In Korea, Iran and Ethiopia we noted that subcontracting was seriously limited by the lack of trust among local contracting enterprises and an almost fierce spirit of independence. Many firms do not want to rely on others for subcontracting, and others are reluctant to engage in subcontracting for fear that they will not get paid by the prime contractor. Foreign firms in turn are disinclined to employ local contractors of whose work they have no experience, particularly when the employer holds the prime contractor completely responsible for the quality and timeliness of work performance.

10. We would suggest a number of measures to encourage subcontracting during the early and intermediate stage of development. First of all, we would have the government as the employer single out parts of construction projects that would be suitable for subcontracting and designate appropriate subcontractors on the recommendation of the contractor development agency that we believe should be established. Secondly, we suggest that both the employer and the prime contractor be protected against the risks involved by requiring the subcontractor to furnish a performance bond in favor of both the employer and the prime contractor. ^{1/} If the subcontractor fails to perform, the employer and prime contractor would jointly fix the liability and assess the damages or would undertake to submit these questions to arbitration should they fail to agree. The employer would guarantee the payment of damages insofar as the performance bond might prove inadequate. Thirdly, we suggest that suppliers and subcontractors be assured regular payment by contractors through arrangements conditioning the employer's periodic payments to the prime contractor on presentation of evidence that the latter had honored his own obligations to pay for work performed or supplies delivered. We would emphasize that these arrangements for promoting subcontracting are intended to operate within the framework of the development program we have outlined and would thus apply only to subcontractors included in the selected group of contractors that would receive various forms of special assistance, including technical advice and training. This would further operate to reduce the risks involved. Finally, we would not expect that the device of designating subcontractors to be used in all contracts, but only in those above a certain size.

Factors Governing Division of Construction Work

11. Previously we recognized that the division or slicing of construction projects and programs for the purpose of bringing a larger volume of work within the capacity of domestic contractors cannot be carried out without reference to practical limitations. Without seeking to be exhaustive, we shall enumerate below some of the more important constraints which have to be taken into account and which in large part are so interdependent that they have to be considered in conjunction with each other:

^{1/} In Chapter VII, where financing is discussed, we have indicated that it will be necessary, in the early development phase, to establish a public fund that would provide all the financing facilities, including performance guarantees, to domestic contractors. While the government as employer cannot, under these conditions, escape the risk of non-performance by the subcontractor in the last analysis, we still think it important to insist on the principle that the subcontractor should be liable.

a) Productivity of the contractor - Expectations about the level of efficiency of the domestic contractor will be an important consideration. At what cost is he likely to be able to perform? How rapidly will he be able to learn and how much experience and time will he require to achieve a desired or tolerable level of productivity?

b) Duration of the construction work - To phase the construction work under a given program over time will involve extra costs in terms of delays in the accrual of benefits, and these may at times be a serious constraint. Similarly, if a domestic contractor requires more time to carry out a specific job, this entails costs in terms of both delays in benefits and a larger commitment of capital during construction.

c) Size of the construction job - Economies of scale will have to be considered, particularly in civil works involving the use of much equipment. In the model road program to which we have already alluded, we calculated the minimum spread of equipment that a contractor would need to carry out a series of five-mile road contracts. However, an increase in the size of such contracts would permit the use of equipment with a larger capacity capable of achieving lower unit costs.

d) Logistics - This may be an important factor in determining the feasible division of work. If highway work is split into many small contracts, mobilization costs may easily become excessive. If the construction of a single road is divided into a number of contracts, each handled by a different contractor, the contractor involved may experience great difficulty in getting their equipment in place and their materials transported. If one section of a highway is short of earthwork for fills while an adjacent section has an overabundance of excavated earth, allocation of the work on these two sections to separate contractors would manifestly create almost insuperable problems.

e) Coordination and Supervision - If a number of contractors are employed on a project which will yield little or no benefit until the whole of it is completed, the work of all the contractors involved will have to be coordinated so as to ensure that they will all complete the work in time. The greater the division of work and the larger the number of contractors, the heavier will be the burden of supervision resting on the employer. When horizontal slicing of construction work is practised, as for example in road construction, the employer will be required to exercise closer supervision over the execution of each "contract slice" and even then may have difficulty in assessing liability for any failures in the project as a whole that may subsequently come to light.

These constraints should discourage any open-ended commitment simply to maximize work opportunities for domestic contractors. On the other hand, they should not be invoked to negate all possibilities for an appropriate division of work. It will have to be recognized that in any set of measures designed to promote the domestic construction industry, there will be a trade-off between the costs involved and the potential benefits. We suggest that the possibilities and constraints of vertical and horizontal slicing be studied more carefully. Pilot contractor development programs will have to experiment with various methods of work division or slicing in order to test the feasibility and cost of various approaches to this problem.

B. Methods of Awarding Contracts

Advantages of Competition

12. We now come to a consideration of appropriate methods of awarding contracts. The award of work to the lowest bidder after competitive tendering has normally been deemed to be the best method. The principal benefits usually attributed to competitive bidding are three. One is that it provides an impartial criterion for the allocation of work that is relatively free of bias and political favoritism. The second is that it enables the employer to get the work done at the lowest possible cost. And the third, closely related to the second, is that it may encourage the survival of the most efficient contractors, thereby lowering the general cost level of construction. These benefits undoubtedly account for the fact that governments almost everywhere require competitive bidding before awarding public contracts. However, we have also noted that this practice was not universally followed in all the countries we visited and that even where competitive bidding is the rule contracts are not invariably awarded to the lowest bidder.

13. The fact that competitive tendering appears to offer an impartial, objective basis for allocating work is particularly important in the public sector where the award of contracts might otherwise be determined by corruption and favoritism. Unfortunately, competition does not always ensure this impartial allocation of contracts in practice. A distinction must be made between the appearance and the reality of competition. In the course of our field investigations we learned of cases where evidently the contractor had been selected in advance and the bidding was in fact "arranged" to confirm this choice. Nevertheless, it must be admitted that competitive bidding does reduce the danger of corruption and favoritism; and if any alternative method of contracting awarding contracts is to be adopted, special precautions will need to be taken to make sure that contractors are selected on the basis of their actual performance or potential capacity, and not on the basis of other considerations.^{1/}

^{1/} Institutional arrangements that would help to ensure this objective are discussed in the final chapter of this report.

14. The cost advantages of the competitive method of awarding contracts are likely to be realized most fully when there are a large number of experienced contractors and the size and composition of the construction market offer many opportunities to obtain work. In Chapter I we emphasized the special risks that characterize the construction business and the difficulties of anticipating and assessing these risks. Estimating the cost of a construction project is at best an art. Even an experienced contractor may make serious and even disastrous mistakes, but his experience will at least give him a better basis for making cost estimates. His financial resources are likely to be considerable. He will be able to post a sizeable performance bond that will provide a reasonably good guarantee that the contract will be carried out at the original price even if he should fail. He will have the reserves that will probably enable him to survive losses that he may incur on some contracts or periods during which he may not have enough work to cover his fixed costs. If he is reasonably efficient, he will presumably be able to avoid prolonged periods of idleness or underemployment in a construction market which is large and diverse. Under all these conditions competition is likely to lower costs of construction.

Disadvantages of Competition in the Early Development Stage

15. In a country where the domestic construction industry is only in the early phase of development, we question that competitive bidding will yield these cost advantages. The new and relatively inexperienced contractors in this industry will for the most part be unable to prepare sound cost estimates. For them the competitive method of awarding contracts is largely a lottery. If one of them is able to prepare a correct tender and is prudent enough to raise his bid to take into account all the risks to which he will be exposed, others will not have the same capacity and may therefore bid well below probable costs. If the successful bidder runs into insuperable difficulties because he has been unable to anticipate his costs correctly or encounters unexpected problems at the site, he will be unable to complete the job and his performance guarantees will probably prove inadequate to permit the completion of the work by another contractor at the same cost. Under these conditions, the government as the employer may well prefer to give the contractor the additional compensation that will keep the contractor from failing and enable him to complete the contract. This has, indeed, often been the case in Iran. Only the rare contractor who happens to come from a wealthy family is likely to have the resources which will enable him to bear the periodic losses and unemployment that will unavoidably occur if contracts are awarded by competitive bidding.

16. Under these conditions it is doubtful that low costs of construction will be achieved. Unless they are "bailed out" through price adjustments, many of the successful low bidders will tend to fail because they have been unable to cover their costs. There may well be

successive series of "fly-by-night" contractors who will have a high rate of attrition but who will at the same time prevent the prudent, cost-conscious contractor from thriving and building up his business. The economy will in the last analysis have to pay the cost of a high rate of failures or for the inevitable periods of idleness from which surviving contractors will suffer. If a civil works contractor invests in equipment for the purpose of carrying out a single contract but then cannot get another job because the market affords comparatively few work opportunities or because another either intentionally or unintentionally bids below costs, it will be not only the contractor but also the economy that will have to bear the cost of idle equipment. Competition is likely to encourage overinvestment in equipment which a developing country will find difficult to support. The civil works contractor who has substantial fixed costs as the result of investment in equipment will quickly go under unless he is ensured the continuity of work that will enable him to utilize that equipment more or less continuously over its life.^{1/} However, continuity of work is important to the construction industry and to the economy of a developing country not simply because it promotes fuller utilization of scarce capital assets. The development of effective enterprises where managers and personnel have become an efficient "production team" by working together over a considerable period is just as important. And enterprises in this sense cannot be created unless there is sufficient continuity of work that will ensure the acquisition of collective experience and the income essential for maintaining and expanding this production team. The importance of continuity of work has been stressed even in developed countries. Thus a special committee enquiring into building and civil works contracting in the United Kingdom strongly recommended the adoption of serial-tendering because it offered "great possibilities for continuity of employment, the development of experienced production teams, etc.; and the banding together of those who have suitable work in prospect is to be encouraged."^{2/}

17. In the light of the considerations set forth in the preceding paragraphs we consider competitive bidding inappropriate in the early phase of the development of domestic construction industries. It may be objected, of course, that there are ways of overcoming some of the disadvantages of

^{1/} See Annex II for an illustrative calculation of his "break-even" point.

^{2/} Ministry of Public Building and Works, The Placing and Management of Contracts for Building and Civil Engineering Work (London, Her Majesty's Stationery Office, 1964), p. 35.

competitive bidding without abandoning the practice itself. Why not concentrate, for example, on helping contractors to prepare proper cost estimates? Our proposals do envisage the provision of training on this subject during the early development phase. We also suggest that the employer provide the contractor with cost estimates and bills of quantities so that the latter can, with the help of the adviser of the contractor development agency, assess and control his costs in relation to this information. But while it is possible to make contractors conscious of some of the elements of cost estimating in a classroom, only experience is likely to give them the proper basis for calculating costs; and the necessary continuous experience will be difficult to acquire when contracts are awarded to the lowest bidder, all the more because the prudent bidder may lose out in the process. It can also be contended that the adoption of procedures to protect contractors against the consequences of excessively low bidding might be adequate. This course has, indeed, been followed in Iran. Yet the adoption of such measures would still fail, as in the case of instruction in the preparation of cost estimates, to ensure the continuity of work that we believe essential for the development of domestic contractors in the early phase.

Allocation of Work on a Cost-Plus Basis with a Ceiling

18. We therefore propose that in the early phase the contractors who are selected for a development group and who are assisted by a contractor development agency should be ensured continuity of work under a system which would reserve for them a certain amount of work suitable to their capacity and would allocate the work among them in accordance with their estimated capacity and on a cost-plus basis. We do not suggest, however, an open-ended cost-plus arrangement but would provide a ceiling. This ceiling would be set by the employer on the basis of the latter's estimate. The employer would prepare a detailed estimate of the contractor's direct costs in carrying out the work, together with a generous allowance for overheads and profit. The contractor would be reimbursed for all his direct costs as disclosed and verified by vouchers and payroll records presented to government inspection, but only up to the ceiling. He would be given an incentive to reduce costs by allowing him to share in any savings in direct costs. An example will help to illustrate our proposal. Let us suppose that the ceiling on a contract is US\$100,000 and that the employer has estimated direct costs at US\$80,000. If the contractor's actual direct costs equal or exceed the total of US\$80,000 but fall below US\$100,000, he would obtain a total payment of US\$100,000. If his actual direct costs exceed US\$100,000, he would still not receive more than US\$100,000. And if his direct costs are below US\$80,000, say, US\$60,000, he would receive as a bonus one quarter of the difference or US\$5,000, as well as the US\$20,000 which the employer originally estimated as his overhead and profit.

19. The proposed system would not, of course, guarantee the contractor a profit. Whether he makes a profit or suffers a loss would depend on how well he manages his business and masters the skills involved.

Nor would he be guaranteed work irrespective of his performance. His continued participation in work would be determined by his progress as measured by his ability to complete work in time, to improve the quality of his workmanship, to build up a competent staff and strengthen his financial resources. The contractor development agency would drop him from the rolls if he failed to demonstrate a capacity for progress.

Progressive Introduction of Competition

20. The contractor should gradually be exposed to competition. In the intermediate development phase we envisage that domestic contractors would compete with each other. On contracts above a certain size or of considerable complexity, foreign firms should also be invited to bid; and this would, of course, have to be done in the case of all contracts financed by foreign or international agencies insisting on such a requirement. However, since many of the developing contractors will need considerable experience to avoid the principal pitfalls of competitive tendering, we believe that they should be protected against the consequences of excessively low bids. Instead of awarding the contract to the lowest bidder,^{1/} we suggest that the successful bid be the one that is closest to the average of all the bid prices submitted after discarding both the lowest and the highest bids.

21. Finally, in the late phase of development we see no need for any limits on competition except through appropriate measures of prequalifying bidders. By this time the detailed records on contractor performance which we believe should be instituted from the very beginning should have provided an adequate basis for classifying contractors by the size and type of work of which they are capable. Provided the standards of classification are sufficiently strict to prevent an "overcrowding" of the construction market, the practice of awarding the contract to the lowest bidder should not impair the continued sound development of the construction industry.

22. Once competitive bidding is introduced, the question arises whether a contractor who is awarded the work should be allowed under any conditions to decline the contract without incurring a penalty. Normally, of course, a bid bond or guarantee is required and is forfeited if the successful bidder declines to accept the contract. However, mistakes are made in the submission of bids. Two cases merit attention. In one case arithmetic errors may have been made in the preparation of the bid which are not apparent in the actual tender submitted. In the second case, the bidder may want urgently to reconsider his bid because he finds that he has not reckoned with certain adverse site conditions or because his bid is so far below that of his nearest competitor, as to convince him that he has seriously underestimated his cost. In general we do not

^{1/} By "lowest bidder" we mean the bidder who, after an evaluation of the bids, is judged to have submitted the lowest bid responsive to the invitation to tender.

believe that he should be permitted to escape his obligation to do the work without incurring the penalty of having his bid guarantee forfeited. At the same time we recognize that the possibilities of making mistakes in preparing cost estimates are legion and we do not believe that the employer has an interest in forcing the contractor to perform work on terms that are likely to bankrupt him. Some consideration might accordingly be given to measures falling short of the forfeitures of the bid bond. In the first case, for example, the contractor might be allowed to withdraw his bid without penalty if he can demonstrate that arithmetic errors have been committed in the bid preparation sheets. In the second case, there would be no reason to release the bidder from his obligation to perform the work, but the contract price might be adjusted by some percentage of the difference between his bid and the second lowest bid. In the intermediate phase, when contracts would not, under our proposals, be awarded to the lowest bidder, the need to withdraw a bid would presumably seldom arise. In the late phase of development, however, this option would be more important.

C. A Program Model for Development of Road Contractors

23. To illustrate our approach to the development of the domestic construction industry in its early phase, we have given in Annex II a model of a road construction program that could be used to provide work experience and training for a group of civil works contractors. Other construction work such as school building programs might also be utilized as a vehicle for developing contractors and might, as a matter of fact, often be more suitable in countries where building must in the first instance be developed. We chose a road program to illustrate our approach primarily because we were asked to give special attention to the development of domestic road construction capacity.

24. Our model program would be phased over five years and involve the construction of 500 miles of roads. The greater part of the program - 350 miles - would consist of rolled bank-run gravel roads with a single bituminous surface treatment. However, the balance would be built to higher standards - 75 miles with dry-bound macadam and a bituminous surface treatment, and 75 miles with an asphalt concrete wearing course. It is quite possible of course, that domestic contractors with a potential capacity to construct roads to these higher standards would not be found and that the number of contractors potentially capable of building the gravel-type road might not even be sufficient. For the purpose of our illustration, however, we have assumed that the whole of this program would be carried out by domestic contractors. For this purpose the program has been divided into 100 five-mile contracts spaced evenly over five years. We realize, as already indicated in the earlier part of this chapter, that in practice such an arbitrary and uniform division would hardly be possible. We have selected a five-mile contract in this case simply because it would be just large enough to permit a contractor to invest in a minimum spread of equipment and achieve a volume of business adequate to test his managerial and technical capacity.

25. The specifications of the component parts of this program have been outlined in the form of method rather than end-use specifications. Unit costs have been calculated on the basis of equipment, labor and material requirements, and an allowance added for overhead and profit to arrive at the total cost of the program. To reduce the financing needed by the participating contractor, his investment in equipment has been kept modest. Thus, certain operations have been reserved for manual labor, though the methods of construction do not envisage extensive substitution of labor for equipment normally employed. An equipment pool from which the contractor could rent machinery that he would need only for specialized tasks or during peak work loads is also provided. The individual contractor's requirements for common labor, skilled labor and higher level personnel have also been worked out in such a way as to facilitate the planning of any training program. Finally, his cash flow has been projected to indicate his financing requirements and the possible financial results. The breakdown of his costs shows that, despite efforts to keep down the contractor's own investment in equipment, his fixed costs would still be such that he would fail to break even unless he were employed for at least 80% of the time.

26. The contractors participating in such a program would be given appropriate financial assistance and would have the benefit of continuing advice and training from a contractor development agency. Some of them would nonetheless fail and would then be replaced if possible by others. We would expect, however, that the practical experience obtained by carrying out a series of contracts, supplemented by training and advice, would permit a number to succeed and to qualify themselves subsequently for larger contracts. The ultimate aim would be to develop a number of contractors that would have sufficient capacity, after taking into account some inevitable attrition, to meet the continuing demand for road construction of this type.

CHAPTER V

ASPECTS OF CONTRACT EXECUTION: DIVISION OF RESPONSIBILITY
BETWEEN CONTRACTOR AND EMPLOYER

1. Once a contractor is allocated work, the degree of his progress will be affected in no small measure by the amount of information and guidance he receives from his client or employer, by the terms of the contract which define his obligations and responsibilities to the employer, by the way in which the employer or the employer's representative interprets the contract and enforces compliance with specifications, and, finally, by the operation of provisions governing the settlement of disputes arising out of the contract. In this chapter we shall examine how these aspects bearing on the execution of the contract work might be handled in the successive phases of our development time frame. Our recommendations have, as usual, been devised to take into account the capacity or capabilities of developing contractors in each of these phases.

A. Information and Guidance Required by the Contractor

2. In Chapter III we emphasized that the employer should be responsible throughout for furnishing the contractor with detailed specifications, drawings and bills of quantities. We indicated that method specifications should be provided, and that the contractor should gradually be held responsible for "end-results" only beginning sometime in the intermediate phase of development. Detailed drawings should be supplied also for temporary works, with the understanding that this responsibility should be increasingly shifted to the contractor during the intermediate phase and assumed entirely, save in exceptional cases, by the contractor in the late phase of development.

Cost Estimates

3. We also stressed the importance of giving contractors detailed cost estimates during the early phase. These will serve not only as the basis for determining the price at which the contract will be awarded, but will also give the neophyte contractor information on unit costs, the number, types and sizes of equipment required and target production rates, all of which he can use in planning his work, controlling his cost and measuring his performance. In the intermediate phase, when the contractor will be preparing his own tenders, we envisage that the contractor will be furnished progressively less comprehensive information on the employer's cost estimates in order to encourage the contractor to make his own independent cost calculations. The extent of such information might vary with the capability of the contractors and the degree of difficulty of the work. In some cases the employer might furnish his estimates of the cost of major items of the work, or of the most difficult items of the work. In other cases he might simply supply his estimate of unit prices without any supporting calculations. In still others he might provide no cost

estimates relating to the particular project, but publish detailed information on average unit prices based on experience with many projects. In the late or final phase of the development program contractors should have gained sufficient experience to enable them to make their own in-house cost estimates without guidance from the employer.

Work Plans

4. The contractor will need guidance in planning his work for a long time. Proper planning may in theory entail the application of sophisticated techniques, such as the use of network analysis for proper sequencing of operations, resource levelling (i.e. scheduling the demand on resources so as to utilize them as fully as possible) and optimizing cash flow and profits, and the use of other linear programming methods for optimizing the haulage of materials, the blending of aggregates and determining the proper mix of construction projects that will maximize profits within given resource constraints. In practice, however, proper planning can be accomplished without recourse to such advanced techniques. It does require conceptual thinking in a mathematical framework, albeit elementary in form. While some of the concepts of work planning can be inculcated through classroom exercises, the neophyte contractor will master planning techniques primarily by example and by application. In the early phase of the development program the employer should furnish the contractor with a complete plan for carrying out the project. The type of plan we have in mind is that which we have worked out in conjunction with the model road program included in Annex II. This detailed plan for a single road contract is cast, with one or two exceptions, only in arithmetical terms and involves no techniques more sophisticated than a simple bar chart.

5. While detailed work plans should continue to be furnished to the contractor in the intermediate phase, we anticipate that in the late phase he will have acquired an appreciation of planning and will have the capacity to devise his own planning techniques. However, even though the employer will no longer need to supply him with detailed plans for carrying out a particular project, the contractor should have the opportunity to learn about modern construction planning methods. Such techniques are undergoing a rapid evolution and even an experienced contractor in the United States has difficulty in keeping abreast of developments. It is therefore prudent to plan for the continuing education of the contractor in this field. This may take the form of furnishing the contractor advanced planning information, such as PERT diagrams or of familiarizing contractors with new planning techniques through seminars conducted by experts in this field.

Field Engineering Data

6. An important issue is the responsibility for field engineering or surveys, especially with respect to vertical and horizontal controls. Determination of working points - i.e. points for line and grade - and the

setting out of the work with batter boards, slope stakes, string and chalk lines, all require a combination of knowledge in the fields of surveying, mathematics, plan reading and, of course, construction practice which developing contractors will take a long time to master. In the early part of the construction development program the employer should accordingly provide these services to the contractor. Government agencies will have no problem utilizing the full-time services of a field surveyor who should be permanently attached to the engineering staff. Since private engineering companies, especially smaller ones, will probably not have need for the full-time services of a field surveyor, the formation of private companies specialized in furnishing these services should be encouraged. Such firms could also offer quantity surveying services. While the employer should continue to exercise some responsibility for necessary field surveys even beyond the initial phase of development, contractors should be expected to acquire during the intermediate phase staff which will be qualified to set out the work.

B. The Terms of Construction Contracts

7. The terms or content of the construction contract may have a significant bearing on the prospective success of the contractor. In Chapter I we noted from our field experience that the contractor usually has little or no say in determining the content of the contract apart from the price of the work. Government agencies which employ contractors generally dictate these terms, and the form and conditions of the contract in many cases follow models which are used in developed countries and assume that contractors are experienced and have considerable resources, or in some cases have been determined long ago for conditions which are no longer relevant.

8. In defining the respective responsibilities and obligations of the contractor and the employer, contracts largely determine the degree of risk to which the contractor will be exposed while carrying out his work. It is understandable that the public employer with his superior bargaining power will usually seek to transfer as much of the risk as possible to the contractor. However, such an attitude is inappropriate in a developing country where the contractor does not have the resources and experience that would enable him to shoulder considerable risks.

9. Among other things the construction contract determines the responsibility for tardy completion of work and for additional or extra work that may be caused by a variety of factors, including interruptions of work, weather conditions, inaccuracies in contract drawings, changes in design and specifications, unanticipated subsurface conditions, increases in the cost of equipment, labor and materials, etc.

10. In general our recommendations on the terms of construction contracts are designed to keep the contractor's responsibilities and risks

at a minimum during the early development phase, and to provide for a gradual transfer of responsibility from the employer to the contractor as the latter gains experience and develops the resources of his enterprise.

The Contractor's Responsibility for Negligence

11. After much careful thought, the Mission has come to the conclusion that neophyte or inexperienced contractors should not even be held liable in the early phase for the cost of extra or additional work that may be caused by their own negligence. We noted that in the countries we visited relatively mature contractors were often generously treated in this respect, notwithstanding contrary provisions in the contract. It should be recognized that the early phase of a development program is basically a learning experience. Contractors included in such a program must be expected to stumble. As long as their negligence is not wilful but stems from well-intentioned but ill-advised actions, we believe that the employer should be prepared to pay them for extra or additional work caused thereby. Such liability should, however, be limited to the price ceiling agreed upon in each contract. Moreover, instances of negligence should be recorded, and a failure to improve over a series of contracts should be grounds for dropping the contractor from the program. In the intermediate phase, which will be a period of transition, responsibility for the consequences of negligence should gradually be transferred to the contractor. This will have to be governed largely by the circumstances, and we therefore do not feel able to devise a general formula. In the late phase of development the contractor should, of course, be expected to bear the full responsibility for his actions.

Responsibility for Damage Caused by Natural Forces

12. The longer the construction period, the greater will be the danger that it will be exposed to damage by natural forces, such as floods, earthquakes and the like. Even when insurance is available, the cost of insuring the work against such risks may well be prohibitive for the developing contractor.^{1/} The employer should accordingly be willing to accept responsibility for the damage. The best way in which he can probably do this in the case of civil works contracts is to accept completed portions or phases of a project before all of the work is completed.

13. We do not suggest, however, that the employer should ever be liable for interruptions in work which are caused by "normal" weather

^{1/} The contractor can, of course, include the cost of such insurance (if available) in his bid, but this may place him at a disadvantage with respect to a less prudent contractor who elects to gamble that the damage will not occur. If the premium is high, the contractor will have to finance the cost until he has received adequate progress payments on his work. Moreover, if the insurer assesses the risks of damage as high, he may be unwilling to write a policy which will ensure the contractor compensation for all the damage sustained.

conditions. From the very beginning the contractor should learn to take into account the effect of weather on his planning and on his fortunes. Moreover, the consequences of such interruptions are unlikely to be serious, and it would be unreasonable to expect the employer to quantify the effect of normal weather conditions on the progress and costs of the work.

Responsibility for Extra Work Due to Unanticipated Subsurface Conditions

14. In civil works unanticipated subsurface conditions often involve the contractor in considerable extra and costly work. In many countries he is expected to pay for such work. In Ethiopia, for example, the general conditions of contract make the contractor responsible for "having ascertained the nature and condition of the ground to be excavated as no claim for blasting of rock or for any other extra will be entertained on this account." We strongly doubt that any contract, let alone the inexperienced contractor with slender resources, should be required to assume such a risk. We believe the employer must at all times shoulder the responsibility for thoroughly investigating subsurface conditions and for alerting the contractor to these findings and their implications for the construction work to be undertaken.

Responsibility for Verifying Drawings

15. Not infrequently the employer's engineer or architect tries to make the contractor responsible for deficiencies in his plans or designs. An instance in point is the stipulation contained in many contracts that the contractor must verify all the dimensions in the drawings and promptly notify the engineer or architect of any mistakes if he is to escape liability for incorrect work. It seems to us especially inappropriate to impose such an obligation on the neophyte contractor. Even the experienced contractor should not be held responsible for errors made by the employer's agent.

Provisions for Escalation of Prices

16. Contractors cannot be expected to develop if they are not protected in some measure against escalation in the cost of materials, labor and equipment. Such protection is particularly important in developing countries which are often characterized by chronic inflation. Contractors should be reimbursed for such cost increases which they cannot be expected to predict or to control. In the early development phase the originally fixed price ceiling will probably not need to be altered to cover the possibility of cost inflation in cases of building contracts which are usually completed within a short time. However, for civil works, which take longer to complete, the price ceiling may have to be adjusted to take into account significant cost increases. In the intermediate and late phases, when contracts are awarded after competitive bidding, a uniform policy governing cost escalation will need to be adopted. It will be preferable for this purpose to develop appropriate construction cost indices

that can serve as yardsticks for determining contract price adjustments. Normally it should be the practice to apply any such adjustments only to 90% of the value of the contract on the ground that the remainder represents the contractor's allowance for profit.

Penalties for Delays in Work Completion

17. The provisions of the contract setting penalties for failure to complete work on time should also be considered. In the countries we visited we found that government agencies were generally lenient in enforcing the penalties for late completion that could be exacted under the terms of the contracts. The Mission itself believes that allowances should be made in this respect for the relative inexperience of the contractor. We suggest that liquidated damages be applied only beginning with the intermediate phase and then only in amounts smaller than those normally assessed against experienced contractors. At the same time we recognize that time is of the essence in almost all construction contracts, and that the employer should be able to apply some sort of sanction to contractors failing to complete their work in time. Such failures should be recorded as debits in the contractor's "ledger of performance." If he fails to complete a contract in time, the size of the contract for which he is deemed qualified in accordance with the prevailing classification system might be reduced; and if this failure is repeated over a series of contracts, he might be disqualified altogether for work during a specified period. The ultimate sanction for chronic and serious tardiness would be loss of membership in the assisted group of contractors. These provisions, which we envisage for the early development phase, could also be applied in the intermediate phase, with the addition, as we have already indicated, of a modest monetary penalty. In the late phase the liquidated damages normally assessed against experienced contractors in the event of late completion would apply.

Settlement of Contract Disputes

18. In the execution of construction work, disputes regarding the interpretation of contract documents and the respective obligations of the contractor and employer frequently arise. It is important to include in all contracts provisions for the expeditious settlement of such disputes. In developing countries the government often tends in practice to act as the final arbiter of disputes to which a government agency is itself a party. In Ethiopia, for example, the Minister of Works in essence makes the final decisions, for, although the contractor has the right to appeal to the courts under certain conditions, this remedy is seldom effective. Developing contractors simply do not have the resources or the access to lawyers which permit them to engage in protracted court proceedings. An appropriate provision for arbitration strikes us as the most rapid and least costly method of settling contract disputes.

C. Supervision and Enforcement of Construction Standards

19. Our final recommendations in this chapter are addressed to questions relating to the supervision of construction work by the employer and his representative. The contractor is often at the mercy of the employer's agent who may be an engineer, an architect or a lower-level supervisor or inspector. Under the law prevailing in most countries, an agent has only limited powers. Thus, if the agent orders the contractor to do something that is not clearly specified in the contract documents, and if the contractor subsequently bills the employer for the extra or additional work, the employer can refuse payment on the ground that the agent was not empowered to order such changes. Under such conditions the contractor is obliged himself to determine the extent of the agent's power. In our opinion an inexperienced contractor can hardly be expected to do this. It may accordingly be necessary to make appropriate changes in the law if the developing contractor is not to be unjustly victimized.

20. The employer's field representative is responsible for ensuring that the contractor adheres to specifications in terms of the standards and quality of construction. His responsibility is great. His duty to the employer is obviously to require proper performance from the contractor. In the interpretation and discharge of this duty, he may harass and make unreasonable demands on the contractor. He often tends to insist on literal conformity to all specifications irrespective of the relevance of such detailed compliance to the purposes the project is designed to serve. If a program is to be launched for the development of domestic contractors, a reorientation of government supervisors or inspectors will be necessary. They will have to be given a better understanding of the criteria or standards they should apply in judging the adequacy of the contractor's performance and under what conditions the relative importance given to each of the criteria should change.

21. An example of the application of different standards may be cited. In one country we inspected a large stadium that had recently been completed. It had undoubtedly been difficult to construct, and it impressed us as convincing evidence that the local construction industry had mastered the capability of building huge reinforced cast-in-place concrete monoliths. At the same time there were obvious deficiencies in the trueness of the surface and the quality of the concrete finish which in western countries would not be tolerated. Yet these defects in appearance manifestly did not affect the soundness of the structure or serviceability of the stadium and appurtenant facilities in terms of their basic purpose. In another country we saw a number of luxury condominium apartments being built by a large local contractor working under the supervision of US construction firms. Here, the contractor and subcontractors were being held to strict requirements with respect to appearance and quality of finish, and, considering the purpose of the project, this standard of supervision seemed entirely justified.

22. In Annex I (see subject VIII) we have tried to indicate the standards which should govern the supervision of projects and the strictness with which each should be applied during the successive phases of the time frame of development. Three questions should be considered relevant. First, is the standard of construction such that the project will effectively serve its intended purpose or function? Second, is the quality of workmanship adequate in terms of the anticipated maintenance costs during the life of the project? Third, what value must be attached to the appearance of the project? The ability of the project to serve its intended function should always be of vital importance. In the early development phase the employer should generally be content with a finished project that will function satisfactorily even though it may be crudely executed by western standards. Quality of workmanship should not be ignored, but will be less vital. Appearance, in terms of aesthetics and quality of finish, will usually be of tertiary importance except in cases of luxury housing and important public buildings which may need to be impressive as well as utilitarian. However, as contractors move into the intermediate and late phase of development, they can and should be expected to conform to progressively higher standards of workmanship and appearance.

CHAPTER VI

EDUCATION AND TRAINING FOR THE CONSTRUCTION INDUSTRY

A. Introduction

1. In this chapter we will deal with the role of education and training in the development of the construction industry. Education, we define as formal schooling prior to employment with special reference to that provided for skilled workers, technicians and professionals. We shall make suggestions for its reorientation, designed to serve the needs of a growing domestic construction industry. Training, we define as the means of providing guidance for people already employed and given in the form both of group instruction and discussion and of individual advice. We shall distinguish between formal and informal training. The former generally consists of instruction given in a "classroom" situation for groups of people and uses a range of teaching/learning methods, while the latter is informal training we associate with on-the-job instruction and advice given to individuals. In the case of contractors, for instance, informal training would be provided on the site and in the office. Finally, we shall examine education and training with reference to the construction industry as a whole, including the public employer as well as the contractor and their respective staffs.

B. Education

General Education

2. In Chapter II, we have already discussed the appropriate educational qualifications for entrepreneurs in the construction industry and expressed our doubt that, save in exceptional cases, people with poor formal education can ever become more than petty building and civil works contractors. We would stress, for example, that a diversified construction industry capable of carrying out a wide range of work may not, in the last analysis, develop in such a country as Kenya, unless the educational qualifications of successive generations of contractors can be improved.

3. Educational qualifications should, of course, be judged in terms of quality as well as quantity. Our observations in the field brought to our attention deficiencies in general education that have often been emphasized. We were impressed with the need to reorient education, and particularly the content of curricula, in such a way as to make students more receptive to occupations involving practical and business skills, such as those important to the construction industry. At the primary level, more emphasis should be given to practical exercises, such as making things with materials like paper, clay and wood or those that are most

readily to hand. Painting and poster making would be a useful preliminary experience to the understanding of technical illustrations. Everyday examples of appropriate technology could be usefully demonstrated and studied, including those concerning building. The same kind of reorientation is needed in secondary and higher education but at a more sophisticated level. Without necessarily educating students for specific careers or professions, curricula could make students more aware of the various career opportunities open to them and motivate them to develop their skills in the context of jobs available to them on "graduation."

Technical and Professional Education

4. At the professional and technician level, the construction industry needs skilled personnel of many kinds, including engineers, architects, quantity surveyors and other surveyors, draftsmen, building technicians, etc., to carry out the design, supervision and erection of projects in both the civil works and building fields. Also vital to the growth of the industry are properly trained skilled workers, such as carpenters, joiners, bricklayers, concrete workers, painters and plasterers, plumbers, mechanics, electricians, equipment operators, etc. In many developing countries there is a chronic shortage of technically educated people at all levels. Where, as in the case of engineers in India and building technicians in Ethiopia, there is a surplus, this is often the result of improper planning in relation to the market or of deficiencies in the orientation and content of technical education.

5. At present there tends to be a gulf between those responsible for design and supervision on the one hand and for actual construction work on the other. This gulf can best be bridged if education to produce these various skills can be more effectively integrated by making at least part of it common to all in such a way that designers, construction supervisors and contractors would have a better appreciation of each other's roles and responsibilities. Engineers, architects and the various types of technicians of subprofessional grade should also have some education in the practical problems of construction, including the problems of management and administration relevant to implementing projects on the ground. Furthermore, since the government is often a major client for construction services and employs large numbers of people to design, administer and supervise the industry, they, too, would benefit from this reorientation of technical education.

6. The expansion of technical education for professionals, technicians and skilled workers has in general followed, rather than kept pace with, the increasing investment in industrial development. Manpower shortages are created and the gaps are often filled by ad hoc and improvised educational "solutions." Often, as the Mission found in Iran, a variety of institutions, each endowed with a large and often excessive complement of machine tools and equipment emanating from different overseas countries, have been established for educating technicians and skilled

workers with little or no coordination of their objectives and curricula. Frequently, foreign teachers who are not cognizant of local needs and conditions are employed. At the professional level university courses are not only too design-orientated, but generally suffer from the "ivory tower" syndrome, and thus fail to prepare the students to cope with the practical problems they will face when they obtain jobs in industry. This has been a serious handicap to the effective promotion of a domestic construction industry capable of undertaking the building and civil works so essential to general economic development. The type of education which engineers and technicians receive often does not prepare them for practical work in the construction industry, either as entrepreneurs or employees. That this state of affairs has continued so long is due in part to the fact that engineers and technicians in many developing countries can still find employment in some sort of executive or administrative capacity in government ministries or agencies, such as the Ministry of Works, where they have no direct responsibility for carrying out construction works or for training and advising those who are engaged in construction. Moreover, the ministries or agencies responsible for technical and professional education often do not have personnel of the technical background and practical experience required for planning relevant curricula and for effective teaching of engineering and technical subjects.

C. Reorientation of Education

7. Greater coordination among the many relevant ministries concerned with professional, technical and vocational education must be achieved. The appointment to senior positions in these ministries of at least some individuals oriented towards, and experienced in, the construction industry, should be considered. One of their tasks would be to coordinate the supply and integrate and upgrade the training of personnel necessary to the future development of the industry. In Iran, a newly appointed team of experts from the Federal Republic of Germany (the country with the longest record in technical education in Iran) is now to coordinate and rationalize all secondary-level technical education. The educational institutions themselves, and particularly those concerned with technician and skilled workers for industry, should, as a matter of priority, reorient their curricula and teaching methods in the light of the practical needs and conditions of the construction industry. Common course material and work projects should be introduced for all levels of personnel who are involved in designing, executing and supervising construction and must therefore be regarded in essence as members of a construction team. Education establishments should use experienced men from the industry in their teaching programs and devise, in cooperation with industry, schemes for students to participate in various types of on-the-job apprenticeship training.

8. In support for the introduction of these new measures, we may cite the general lack of enthusiasm on the part of employers to use the

"products" of technical institutions. They complain, and in our view with some justification, that their prospective employees are not suitably trained. In fact, they contend that such men are the least satisfactory to employ since they tend to be more demanding and less adaptable in their work. However, we also noted that many firms show an inadequate appreciation of the need to employ properly trained staff. They are often reluctant to pay the higher wages that trained people demand and prefer to employ, wherever possible, those with the least qualifications in order to use them in the roles and at the wage levels they consider appropriate. This attitude tends, on the one hand, to limit opportunities for technically trained personnel and, on the other, to force firms to train people themselves on-the-job, often to carry out very specific and limited tasks.

9. In summary, we found little evidence to suggest that technical education was making anything other than a marginal contribution either to equip the student for a job in his chosen field or to meet the contractor's needs in trying to find suitable employees. For instance, the Mission found that construction labor skills were, in practice, virtually all developed on-the-job. In addition, we noted insufficient liaison between the technical school system and industry and little recognition by either party of the need to improve this situation. The Mission came across two exceptions to this general rule. The first was at Ulsan Technical Institute, which was recently established in the industrial southeast of Korea and where attempts were being made to contact and place students in industry for a part of their training, though not, unfortunately, in construction. The second was the Industrial Training Board in Iran which functions under the joint auspices of the government and industry. This Board has taken the initiative to develop better training programs for the specific needs of 26 industries. Construction was one of the first industries to be included in this program, and efforts are now being made to increase the quantity and quality of training available for skilled workers, technicians and technical instructors. Sensibly, the industries themselves have been given the principal responsibility for carrying out the program, thus ensuring appropriate emphasis on in-plant training courses.

D. Training

The Mission's Observations in the Field

10. In Korea, where the standard of formal technical education is generally poor, the Mission found a number of constructive approaches to job-oriented teaching by both the industry and government. The construction industry itself has taken the initiative to upgrade existing workers to supply the required personnel at middle management levels, such as foremen and supervisors. The Contractors' Association of Korea (CAK) established a Construction Workers Training Center (CWTC) in 1967. Though ultimate control of both organizations lies with the Ministry of Construction, the contractor members of the CAK determine the training policy and

methods of the Center. The latter is situated in downtown Seoul with sufficient adjacent land for future expansion. The major responsibility for the financing, borne hitherto by the Government, is to be assumed by the industry in the future. Though the results to date are well below the original expectations, the industry has recognized, at least on paper, the magnitude of the training problem. Thus, the Center plans to provide six-month upgrading courses for 23,000 people and one-year courses for 8,000 new recruits over the next four years. So far only 550 trainees have attended courses and these have been limited to training wood-workers and heavy-equipment operators. While the courses are rather arbitrarily divided into three equal periods for classroom, workshop and site training, this division does recognize the value of practical and on-the-job training. The content of the courses and methods of teaching as well as the workshop facilities are still in many respects deficient. The teachers, however, are drawn from the industry and bring with them the practical orientation we believe to be essential to technical training. Above all, this effort by the industry to meet its own pressing training needs recognizes two important principles. One is that contractors themselves and the associations that represent them should play a major role in the training required for development of their own enterprises. The other is that the industry can and should through its own example help to improve the policies and practices of technical education.

11. In Iran, the initiative to rationalize and upgrade the manpower needs of the construction industry comes from the government which established the Industrial Training Board (ITB) in 1971. This Board is financed from the proceeds of an industrial training levy of 2% on turnover, and thus has sufficient financial autonomy to be independent of government. It promotes formal and informal industrial training in two ways. The first is through the establishment, throughout the country, of a range of public and private vocational training centers which are to provide numerous industry-based in-service training courses. In this connection the ITB is seeking to persuade industry to make available experienced men who would be tested and qualified to become training officers in their own firms, and to institute appropriate in-service courses for upgrading skilled workers. While progress in this respect has been slow owing to the reluctance of management to invest in training, cooperation with the Board's activities is gradually increasing. Secondly, the ITB is planning to establish a Staff College which, in the first instance, will focus on the training of persons designated by particular firms to become training officers but is ultimately to be developed into a center for the development of a corps of people who want to take up industrial training as a career. The course material and teaching methods are based on the UK Training-in-Industry programs, but are specially adapted and translated to suit the needs and conditions of Iran. The ITB's organization and operations are characterized by certain features which deserve particular emphasis in terms of their relevance to similar programs that might be initiated elsewhere:

- a) the ITB, though established by an Act of Parliament, is financially independent and able to work directly with industry on a national scale;
- b) its staff has been selected for their practical experience in the industries for which training is provided;
- c) the work of the Board has been carefully scheduled and programmed to reach stated objectives, thus assisting in the evaluation of its progress;
- d) it has been able to carry out its activities of research, publication, teaching and consultancy with its own personnel and resources;
- e) it is directed by a dynamic management with sufficient status; and
- f) its management and staff, consisting of 50 persons, are all Iranian except for one adviser who has considerable experience in the country.

12. In Ethiopia the Imperial Highway Authority (IHA), a para-statal organization charged with planning, maintaining and in some cases building roads, has a Training and Testing Branch for upgrading its own force of skilled workers and supervisors. This Training Center is on the site of the IHA's plant maintenance yard situated 20 miles out of Addis Ababa at Alemgena. Since it was started in 1956 training courses have been provided for some 2,800 equipment and motor vehicle operators and mechanics. In addition about 1,000 road superintendents, foremen and other supervisors have attended courses there. Great emphasis is given to training on-the-job, particularly to skills in equipment operation and actual road construction. It is interesting to note that this Center has combined training with trade and skill testing and has thus been able to adjust its teaching program and curricula accordingly. The Mission was impressed with the systematic and well-organized approach to the teaching of courses and the general sense of purpose and care given to their execution. The teaching materials and aids are of a relatively high standard but need to be brought up-to-date, as many were introduced when the IHA was established some 20 years ago. At the time of our visit 32 IHA supervisors were in residence on a refresher course in general construction management and technology covering a variety of subjects from surveying to maintenance of wage records. These refresher courses, lasting from a week to three months, are an attempt to rejuvenate the flagging interest of the provincial branches of the IHA who gradually stopped sending people to the Center in the late 1960's. The Director, who was appointed two years ago, and is a graduate from the College of Building in Addis Ababa, attended a three-month course at the International Labor Organization (ILO) vocational training center at Turin, Italy. This experience has shown him how to rationalize and reorient the training provided by the Center and thus renew the interest and support of the provincial branches. The Mission believes that many directors engaged in technical education and training throughout the developing countries would greatly benefit from similar experiences.

13. Another example of a constructive approach to training is the Construction Officials Training Institute (COTI) of the Ministry of Construction (MOC) in Korea. It is designed in particular to instill in the Ministry's officials an appreciation of each other's responsibilities and a positive attitude toward cooperation, which in the past has often been lacking in the construction industry. Personnel in MOC and in other "client" ministries and government corporations (including those in provincial offices) are required to attend courses. These last four weeks are designed for senior officials and corporation managers, provincial engineers and administrators, and also for specialists and new recruits. Relevant curricula and current texts have been prepared to enable personnel in each staff grade to improve their management skills and their appreciation of their particular roles and duties within the overall context. The emphasis is not only on the introduction of modern management techniques and improvements in construction technology, but also on the motivation of officials to relate their work to socio-economic development activity both at the local and national levels. The Mission considers the inclusion of this motivational and contextual orientation in training particularly valuable for a growing construction industry in a developing society.

14. Through the activities of the Construction Workers Training Center in the private sector and of the Construction Officials Training Institute in the public sector, Korea is well served. However, the Mission considers it desirable to make the training in these two sectors a joint exercise. A brief experiment was attempted along these lines in northern Nigeria in 1970, when a series of four-day construction management courses were arranged for contractors and government officials. It was generally agreed by the participants from both the private and public sectors that they had learned more about each other's problems in four days than had been possible in the past.

15. All the examples of on-the-job training mentioned in the preceding paragraphs have focussed on training and upgrading the individual skilled worker and technician employed either in government or in the construction industry. Kenya is the only country where we found a training scheme focussed entirely on the development of the contractor-entrepreneur and his enterprise. In Chapter I we have already commented on this scheme which has been administered by the National Construction Corporation (NCC) as part of a more comprehensive program providing work and financing as well as supervision and training for African contractors. Here, we need only recapitulate the principal shortcomings and difficulties of the NCC's training program which sought to give contractors both individual advice and opportunities to participate in brief training courses. Among these were: (1) the rather low educational levels of the contractors which seriously limited their ability to absorb advice; (2) the excessive emphasis on technical problems arising largely from the fact that the Norwegian personnel concerned with training

were primarily technical in their orientation; (3) the failure to relate organized training courses effectively to the concrete problems encountered by advisers in the field; (4) the excessive reliance in such courses on lectures rather than on discussion of specific problems and situations as illustrated by case studies, role playing games, etc.; and (5) the inability to focus advice and group training continuously on a limited number of contractors who, on the basis of their performance, had demonstrated a capacity for development.

E. The Mission's Proposals for a Training Program

Training for Government Personnel

16. Government officials concerned with construction will need in-service training as well as contractors and their personnel. The focus of this training should, in the first instance, be on government personnel responsible for project design and specifications, contracting procedures and contract administration and be designed to acquaint them with the objectives and elements of the proposed contractor development program. Following this, training should be directed towards the concepts of value engineering and the criteria and standards that should be applied in the supervision and acceptance of construction work. Furthermore, those government staff particularly concerned with designing and specification writing should be made familiar with the capabilities of contractors and the resources of the local industry as a whole. In addition to this specially devised training, construction officials should be enabled to obtain a better appreciation of the contractor's problems by "sitting in," from time to time, on organized training courses for contractors and by accompanying the personnel assigned to advise contractors in the field.

17. It is undoubtedly vital that all government personnel concerned with project design and supervision should be given, through in-service training, a better appreciation of the contractor's problems and requirements. In many respects the development of a domestic construction industry depends on the development of a better understanding and knowledge on the part of the employer of the contractor's problems.

Training for Contractors

18. The Mission would like to emphasize that contractor-training should complement his work experience. A contractor will learn principally by "doing," but he will not know how to effectively correct his mistakes unless he has the benefits of constructive suggestions given through advice and training. Thus, primary focus of our proposed development exercise will be directed towards training for the contractor and the personnel that go to make up his enterprise. This training will be made available in two ways: primarily through informal training or operational "on-the-job" advice, but also through complementary formal training given in a

"classroom" situation. Both types of training should cover a variety of subjects in a manner relevant to the proper management of the development of a contracting enterprise. These would include:

- a) General orientation in all problems involved in construction. In the beginning this should, perhaps, put a special emphasis on the contractual relations between the employer and the contractor and their respective responsibilities. The contractor should be given an idea of the part he plays in the construction process, as a member of the construction team, comprising employer, contractor and suppliers.
- b) Estimating and pricing of construction work. From the outset the contractor should be made conscious of the relative costs of various elements of the work on the site, particularly of labor and materials. Later, as the contractor's ability grows, training will be needed to acquaint him thoroughly with the means of pricing detailed bills of quantities to enable him to tender for contracts.
- c) Record-keeping for cost control (in association with subject b) above) and documentation of all receipts and expenditures. This would include the keeping of appropriate books of accounts.^{1/}
- d) Understanding drawings and specifications. The contractor usually experiences difficulty in understanding these because in many instances the information is presented in a manner unfamiliar to him. He often needs assistance in interpreting three-dimensional objects that are presented in two dimensions on paper and also with the unfamiliar language that is used to write specifications.
- e) Programming and scheduling of work. This should focus, in the first instance, on the phasing of the construction works and the labor, materials and equipment required for carrying out a single contract and should help him not only to plan his work and anticipate his financial needs, but also to measure actual work progress against the program.

^{1/} A recent study carried out by Building for Development on the Work of the National Construction Corporation in Kenya states: "The key to building up a contracting business...lies in the installation of... a suitable but effective budgetary control system...and the salient factors affecting the progress of the business should be on paper rather than in the proprietor's head. It is this step to a written system of controls that most contractors find hardest to make." See Building for Development Information Paper No. 7, "The National Construction Corporation, Kenya; Study of an African Contractor Training Organization, April 1972.

At a more advanced stage, when the contractor becomes capable of carrying out a number of jobs at the same time, it should be related more to the planning of all of his operations and the development of his enterprise as a whole.

f) Financial planning for both specific projects and the contractor's enterprise as a whole. In the early stages training for financial planning for a job will be done in conjunction with subjects b) and e) above. Financial planning, including budgetary control for the contractor's enterprise, is most important and should from the beginning be stressed in all aspects of training. Later, appropriate financial management techniques can be introduced to assist the contractor to effectively plan and manage the growth of his company on a sound business basis.

g) Personnel management and training. This would aim to develop on the part of the contractor-entrepreneur, a consciousness of the need to employ properly qualified personnel and to give appropriate attention to their training and supervision.

19. No doubt there will be other subjects under the broad headings of construction and business management for which training will be necessary. We have listed those that the Mission found contractors were most in need of. The degree of emphasis given to each of these and other subjects, as well as the methods of imparting the training will depend on:

a) The previous experience and educational background of the entrepreneur. Depending on his background the focus may have to be either on management of the business aspects of construction or on technical problems. For instance, training for the artisan-entrepreneur in the building field, who has some technical skills but relatively little formal education, must in the first place inculcate some elementary knowledge of the business aspects of construction management. The engineer or technician-entrepreneur, who has a good general and technical education, has the same requirement, but at a higher level of sophistication. On the other hand, the businessman-entrepreneur in construction who knows something about business will need, in the first instance, to acquire a proper appreciation of the technical aspects of construction and of a need to employ the requisite technically trained people.

b) The nature of the construction work which the contractor is carrying out or expects to undertake. We have classified this work into two broad categories - "conventional" single storey buildings, and "modern" multistorey buildings and civil works - which impose different demands on the technical skills and, to some extent, on the managerial capacity of the contractor.

c) The stage of development of the contractor. The latter's problems and need for guidance will obviously depend on whether he is in

what we have called the "early phase" of development or in the "intermediate phase."

The detailed conclusions of the Mission on the primary and secondary focus of training for various types of contractors are given below. In this context we have also distinguished between "existing" and "new" contractors.

Training in Relation to the Experience and Background of the Contractor

20. The orientation of the training should vary in accordance with the background and prior experience of the contractors. Thus, one must distinguish between the "existing" and the "new" contractor and between the contractor who has a background only in business and the one who has only some technical qualifications.

The "Existing" Contractor

21. Contractors who are already in business will obviously be the primary concern of any training program. However, the practising contractor may initially be unresponsive. Having had some practical experience, he is likely to be skeptical of the value of assistance preferred by outsiders whom he does not know and of whose capacity he is not convinced. In particular he will probably not be receptive toward suggestions that he take the time to attend formal training courses. His confidence must first be won, and this can be done only if the persons concerned with training can, through visits and discussion on the site, tender advice on concrete problems that will result in tangible improvements in the way in which he is carrying out his work. Initially, this advice may have to focus on changes in construction techniques and procedures that will expedite the work and lower costs. Once the contractor appreciates the value of such advice, he will be amenable to other suggestions relating, for instance, to record-keeping, improvements in the ordering of materials or the hiring of more competent personnel. Gradually he will then become receptive to proposals that participation in formal training courses or seminars will give him the opportunity to master more systematically certain subjects vital to effective construction management.

The "New" Contractor

22. For the "new" contractor, however, participation in a short training course might well be required at the beginning, in order to help the contractor development agency to determine whether he has the qualifications, apart from certain technical skills, for the construction business. Such a course, lasting three or four days, would be designed to test his

motivation and his general appreciation of the management problems involved in the construction business. The training staff will need to be familiar with certain techniques ^{1/} for testing and, to some extent, developing achievement motivation in the would-be entrepreneur. Properly applied, such techniques can help to determine to what degree he is motivated by testing his interpretation of illustrated material depicting certain situations, his reactions to, and behavior during, the playing of specially devised "games," and his response to specific case study material suitably presented. They will indicate to what extent and under what conditions the individual is prepared to take risks and has a commitment to certain personal goals and the capability to translate these goals into practical means for achieving them.

The Artisan and Engineer or Technician-Contractor

23. The methods and content of training must be adjusted to the educational qualifications and previous experience of the trainee. The artisan-entrepreneur in the building field, who has some technical skills but relatively little formal education, must, in the first instance, be given some elementary knowledge of the business aspects of construction management. In the beginning, the contractor with a primary level of education may well be reluctant to reveal his ignorance or be fearful that he cannot master the techniques recommended by the training personnel, particularly if he left school 10 or 15 years ago. The training staff will have to gain his confidence in direct discussions with him. The contractor will be more encouraged to speak frankly and be less inhibited about displaying his own ignorance if he does not have to do so in front of his fellow contractors. Discussions conducted on the site might cover such topics as record-keeping, including elementary accounting, ordering and purchasing materials and requirements and sources of credit. The training staff will need to cultivate a sympathetic understanding of the contractor's problems and a capacity for devising practical solutions that are within his competence. They will need to help him in establishing relations of trust and confidence with his suppliers and with the bank, in which he keeps an account and which should be able to assist him with the financial management of this business.^{2/} Constructive advice on how to deal with the demands and requirements of the client, who has awarded him the construction work will also be needed. Through sustained contact with the contractor on a regular basis, the training staff will be able to prepare suitable teaching/learning course material. Such material will need to be devised to catch the imagination of the contractor and encourage his maximum participation in organized training courses by using well illustrated practical exercises

^{1/} Referred to previously in Chapter II; paragraph 17.

^{2/} See Chapter VII for the Mission's recommendations on the role of banks in the development of contractors.

and business games, devised in such a way that he will appreciate their relevance to his own business. However, the artisan-entrepreneur will almost certainly also need additional training in construction techniques and technology during the "early" development phase; and this would be provided on the construction site in the form of individual advice and group demonstrations. This type of training might be carried out in conjunction with a local education institute with the necessary workshops and equipment. While training should at first focus primarily on the contractor-entrepreneur himself, more attention will gradually have to be paid to instruction of his staff, e.g. of clerk-bookkeepers in the maintenance of records, and of foremen in the proper supervision and training of workers employed on the site. Informal training of such personnel in the office and on the site should progressively be supplemented by short formal courses using teaching/learning "models" derived from actual case material.

The Businessman-Contractor

24. A third category of contractor, apart from the artisan and engineer or technician-entrepreneur is the businessman-contractor. He is attracted to construction not because he has any special skills in this field but because he sees it as an opportunity to make money and perhaps to diversify his business interests. If he is well educated and has considerable capital and prior business experience, he may overcome his lack of technical knowledge by employing experienced staff. This staff should be knowledgeable and experienced in construction methods and site management, particularly in supervising and training labor on the site. Frequently, however, the business type of contractor will have only a low level of education and an inadequate appreciation of the technical problems involved in construction. He may therefore not be conscious of the need for trained staff and therefore reluctant to pay adequate wages or salaries, or he may be suspicious that personnel of superior skills will cheat him. Thus, in the first instance, training will have to give him a proper appreciation of the technical aspects of construction and the need to employ the requisite technically trained and experienced people. This will not be an easy task, particularly if success in a prior business has given him an exaggerated idea of his capacity to undertake any sort of business venture. Great care will have to be taken by the training staff to present the technical material in such a way as to awaken in him its value in terms of sound business practice. Preferably he should be persuaded to enter into a joint venture or partnership with another firm or individual who does possess technical qualifications.

Progressive Changes in the Subject Matter of Training

25. As and when the contractor progresses, the training program should focus increasingly on more specialized subjects and explore these in greater depth. More attention will have to be devoted to the type of management techniques, including financial planning the contractor will need to adopt in order to achieve an expansion of his enterprise. If the contractor is

relatively new to construction but is progressing well, further informal training will be needed in construction methods, probably including the correct use of concrete mixers, scaffolding and other elementary items of equipment used on a building site. Group demonstrations, visits to other construction sites and special instruction by equipment suppliers should be arranged by the training staff both for building and civil works contractors. In preparation for the "intermediate" phase, a wide range of construction management subjects, with special emphasis on more advanced programming and scheduling for a number of jobs and financial planning of the enterprise as a whole, will be necessary. Since the contractor will be exposed to competition in the "intermediate" phase, training should gradually prepare him to deal with the problems of tendering, estimating and pricing with which he will have to cope.

26. As the contractor achieves a certain standard of proficiency in the "intermediate" phase, the conditions under which he operates will be altered. ^{1/} To the extent that special training programs may still be necessary, they will have the same general focus and content as mentioned above. Contractors with a growing volume of business (measured by the number and size of contracts in the "pipeline") and with jobs of an increasingly sophisticated type (assessed by the level of technology) may require further training and advice on estimating and tendering, contract procedures, advanced cost accounting and budgetary control, personnel management and training, as well as construction technology and techniques. This will be particularly true for contractors, who may have started out building "conventional" single storey structures but who, due to their high standard of general education, have been able to progress to "modern" (multi-storey) buildings, involving the use of reinforced concrete frames and more complex installations and fittings. In this intermediate phase the number of specialist subcontractors and civil works contractors may well increase significantly, and these will need specially devised training and advice. Typically, special attention might have to be given to electrical, plumbing and air conditioning equipment installation and maintenance, and on the selection, maintenance and operation of equipment for road construction and other civil works jobs.

27. As and when contractors show signs of progress, training should increasingly be directed toward building up and improving the technical and office personnel of their enterprises. Special group training courses, including site and office demonstrations, will probably have to be arranged for such staff which, broadly speaking, will fall in two groups: (1) personnel working on the construction site, including the various levels of site management staff from gang foremen to site agents and managers engaged in different types of construction work; and (2) personnel working in the head office, including accountants, draftsmen, estimators, surveyors, record keepers for labor and wages, contract administrators and planners, superintendents, motor vehicle and equipment staff and mechanics, materials storemen, and clerical filing staff. To meet these needs the training staff should consider enlisting the assistance of various organizations that may

^{1/} See Item III of Annex I.

be locally available, such as those concerned with business and supervisory management training and commercial and technical colleges. Professional associations could be asked to provide, through their membership, on-the-job training for draftsmen, accountants and estimators. Trade associations concerned with promoting certain building materials, equipment and plant could be pressed into providing specialist instruction in the use of their products. In the "intermediate" phase training would generally be provided only for contractors who require special assistance on particular subjects, such as advanced business management techniques.

28. Though partnerships between businessmen and technically qualified people have often been promoted and attempted in the past, they have seldom succeeded. Two factors have been principally responsible for their failure. One is the difficulty of finding two partners who are willing to trust each other and who are convinced that each can make a special and equal contribution to the success of the enterprise without the fear that one will eliminate or exploit the other. The second is the fact that impartial advice on the establishment and management of such partnership arrangements is seldom available. There is often little knowledge and understanding of the methods and procedures for establishing joint ventures, partnerships and limited liability companies. The training staff should be in a position to provide such impartial and practical advice and to assist in innovating different and more appropriate types of business arrangements. In providing such advice, however, the staff will have to be cognizant of the social environment in which they are operating and take steps to avoid being the target of blame, should such ventures prove unsuccessful.

Informal Training and Individual Advice

29. The principal advantages of individual advice are that it can: (1) concentrate on the practical problems and deficiencies of the contractor; (2) take and guide him through all of the successive steps of the construction process; and (3) produce the practical experience, case material and knowledge of critical problems which will help to determine the content and focus of organized formal training courses.

30. The training staff should, however, be aware of the difficulties of providing informal training on the site and in the office. The working environment is not ideal for absorbing information and advice other than on very specific problems and points of detail. It does not provide favorable opportunities for systematic training in any one subject. There is also a danger that the adviser on the site may in essence become simply a building inspector interested only in ensuring that the contractor works in accordance with specifications. However, the adviser can play a useful role in guiding the contractor and his staff on each successive step in the whole sequence of operations involved in carrying out a single contract. Thus, for each contract the adviser can prepare a checklist on the timing, nature and methods involved in each sequential step of the construction process. After each visit to the work site and observation of the work in

hand, the adviser and contractor (or his superintendent) can then discuss, on the basis of the checklist, the progress of the work and the necessary action that needs to be taken to remedy any differences which have been observed. Appropriate notations on the checklist will provide a useful record of the progress of the contractor and his responsiveness to advice.

Formal Group Training

31. Formal group training is important not only because it is more economical for training personnel, but also because certain subjects lend themselves more readily to systematic exposition than to ad hoc advice. Organized training should focus primarily on problems relating to construction management, including contract terms and procedures, methods of estimating and tendering, cost control systems and budgeting, job programming and labor and materials scheduling and record keeping, particularly accounting. At a more advanced stage, such training could be broadened to include marketing, insurance, plant management, measurement and invoicing of completed work, borrowing money and banking practices, work study, personnel management and training, and site safety and welfare. Certain technical subjects can also be covered by organized training. Training courses should be designed to promote a proper understanding and interpretation of specifications and drawings and to explore specific technical subjects, such as methods for producing and using concrete, roofing problems involving the use of different materials and methods, road construction techniques, etc. The "classroom" work in such courses, which would have to rely heavily on technical illustrations, would in most cases be usefully supplemented by visits to construction sites.

32. In general, the subject matter of training courses must be determined in light of the current needs of the contractor and the constraints governing the number, location, length, and timing of such courses. Their detailed content can be prescribed only in the context of a particular country, taking into account the type and level of contractors to be trained and their special needs. When considering the structure of formal training courses, the training staff should: (1) limit their duration to not more than a week, so that contractors and their personnel will not be deterred from attending; (2) group participants as far as possible by level of their prior education and experience so that their capacity to learn will be more or less uniform; (3) proceed as soon as possible from general courses to more specialized courses; (4) structure the course content to practical problems identified by experience in advising and observing contractors in the field; (5) encourage "learning" as far as possible through discussion of case material and actual examples rather than by lecturing; and (6) make sure that the training personnel concerned with advising the contractor in the field participate also in the organized courses.

33. Formal training carried out with groups of 10 to 15 people will need to use a wide range of modern adult education techniques. Maximum

participation by trainees in the "learning" process should be encouraged by the use of individual or group exercises and business games. These would involve the use of written exercises in conjunction with "role playing" techniques to demonstrate, for instance, the working relationship between the different parties involved in a construction contract. To be effective and worthwhile, in-class learning must be an integral part of the whole development process.

Evaluation of the Training Program

34. At the outset the Mission emphasized the need for measures that would keep the cost of a contractor development program within reasonable bounds.^{1/} Measures to evaluate the impact of the training on the capacity of developing contractors are particularly important in this connection. Previous experience with this kind of development training aimed at the emerging contractor is severely limited. In fact, Kenya appears to be the only country where training of this type has been carried on for some years, but where necessary improvements in training methods have been delayed by the lack of continuing or periodic evaluation.

35. The Mission believed that such an evaluation can best be made on the basis and with the help of: (a) contractors' work performance records; (b) a charted development "path;" and (c) a clear definition of training objectives.

a) Contractors' Work Performance Records. - Careful and realistic records should be kept on the performance of contractors in executing construction work and on the development of their enterprise over a period of time. The Mission has already indicated the types of information that should be recorded for this purpose.^{2/} In summary, these should reveal the degree of progress that contractors make in (i) carrying out their contracts on time, (ii) completing their contracts within the original cost estimate, (iii) meeting the standards for provisional and final acceptance of the job by the client, (iv) building up their staffs, (v) increasing their financial resources and creditworthiness, and (vi) expanding the number of contracts and total volume of business they can handle.

b) Chartered "Development Path" - This performance should be measured against a set of targets that each contractor might reasonably be expected to attain over time. Such targets, worked out jointly by the contractor and his adviser, might take the form of a "development path" extending initially over one year and later over a progressively longer period. This would help to motivate the contractor to reach certain objectives in the growth of his business within a set time frame and would

^{1/} See paragraph 29, Chapter I.

^{2/} See paragraphs 16-19, Chapter II.

enable the training staff to plan the step-by-step application of both formal and informal training and advice. Until sufficient experience has been gained by the training staff, it will, of course, be difficult to chart an appropriate and realistic "development path" for the participating contractors. Experience should, however, make it possible to perfect this technique and thus, to measure the adequacy of the contractor's progress. The emergence of serious discrepancies between the contractor's performance and the projected development path can then be used as a device for screening out contractors on the grounds of their inability or unwillingness to learn.

c) Training Objectives - Such objectives should be clearly defined in advance so that the value of the actual training process itself to the contractors can be properly assessed. In discussing training with officials, the Mission found that they were primarily concerned with what to teach and how to teach, rather than with efforts to obtain evidence of "learning" by the trainees. We would stress that the object of learning through training (both formal and informal) is to influence and try to change the behavior and working methods of contractors. Particular training objectives should therefore specify what the "learner" could be expected to know and do at the end of training courses or periods. In the light of these objectives, training can be planned on a step-by-step basis and the contractors can also be better motivated to achieve certain targets and to develop the confidence, knowledge and ability necessary for the growth of his enterprise to its optimum level.

Sources and Recruitment of Training Staff

36. The size, composition and orientation of the training staff required will have to be determined in the light of conditions in the country where a development program is undertaken and will involve a proper assessment of the actual capacity of domestic contractors and their personnel and of the number of entrepreneurs that will eventually be needed to match, at least in part, the construction demand in that country. In many cases, it will be necessary, at least initially, to recruit the training staff from outside the country. A careful and thorough exploration of the possible sources of recruitment should be undertaken. Men with a broad experience of both the technical and business aspects of construction will be needed. This type of experience is most likely to be found among people who have been successful as entrepreneurs or as managers in the large number of small- and medium-sized construction firms that can still be found in the US, the UK, or continental Europe. However, in addition to the necessary practical, technical and business experience, they also must have the patience, interest and ability to communicate which are needed, if they are to work in the socio-economic environment of a developing country. Candidates with such qualifications can probably best be found with the help of representative bodies of contractors in the countries mentioned above. The experience with the Norwegian personnel of the National Construction Corporation in Kenya illustrates the importance of avoiding recruitment of experts who are too specialized, which is usually the case of

personnel working in large companies. Such men are often too technically oriented, lacking knowledge of the vital "business aspects of contracting, including organization and management, financial planning and record keeping and accounting,"^{1/} so essential to the proper functioning of a small construction enterprise. Nor is it desirable to recruit management "experts," who will have difficulty in addressing themselves to the relatively low-level management problems encountered in developing countries.

37. Another potential source of personnel may be found among people, especially from the UK and France, who have spent a considerable time overseas as construction works supervisors in government service. Some of these have been exposed to the problems of local contractors and will be able to give practical, down-to-earth advice, though principally on technical matters. They will need careful screening, as their local experience may be more of a handicap than an advantage. Depending on the level of development of the country seeking assistance, it may often be more appropriate to recruit experienced people from the more developed of the so-called developing countries or from the less well-developed European countries, such as those bordering on the Mediterranean. The candidates from such countries may find the problems with which they will have to deal more similar to those in their own countries.

38. Local staff should be recruited in the expectation that they will replace as soon as possible all permanent foreign staff, with the exception of those that may need to be retained for certain special tasks. However, local staff should not be recruited simply as counterparts or "understudies" to the expatriate staff with a virtually automatic right to succeed them. They should be promoted only as and when they acquire the requisite experience and competence to handle particular assignments. It will not be easy to find people with the required actual or potential qualifications. Some may be recruited from indigenous personnel who have had some technical and business experience working with resident foreign construction enterprises. Persons with considerable experience as supervisors in ministries and departments of public works may also be qualified. Adequate inducements in the form of salaries and other conditions of employment will have to be offered.

The Number of Staff

39. It should be kept in mind that the basic functions of the personnel of a contractor development agency will be to: (1) determine which contractor, new and existing, have a potential for development and need assistance; (2) help to procure for such contractors construction work that will provide suitable work experience; (3) devise and conduct formal and informal training programs; and (4) recommend financing for participating contractors. In discharging these functions during the "early phase" of development, the staff will have to spend considerable time with each contractor in the development group. We envisage that on the average

^{1/} See Annex IV, paragraph 14 of this report.

one day a week should be spent with each contractor on his site or in his office. A training team of two people, probably one expatriate and one local, could thus work with five or six contractors. Thus, if the number of contractors in the development group totaled 50 or 60, the training staff required would be about 20. In addition, there will need to be a director to give overall guidance, probably a specialist in adult education techniques, who can advise on methods of training, and perhaps, someone specially qualified to help contractors with accounting and record-keeping. At some stage other experts might be needed to advise, for example, on construction plant and equipment. Further support staff will be needed to provide clerical services for the agency itself. Altogether, a total staff of 40 to 50 people might be required for a contractor development agency dealing with 50 or 60 contractors in the early phase of development, but the number of staff needed in relation to the number of contractors is likely to be much less if contractors are already more advanced.

Orientation of the Training Staff

40. Candidates for the expatriate training staff will need to be subjected to a carefully devised program of orientation on the nature and scope of the development exercise, the conditions under which they will be working and the roles they will be expected to play. It would be desirable to have at least some preliminary orientation outside the country where they would serve. This should help to determine whether candidates have the patience and perseverance, the capacity to innovate and to communicate in a "learning" situation and, thereby, reduce the risk of jeopardizing the whole project by selecting the wrong people.

41. In the chosen country itself members of the team should receive orientation on the state of the country's development, the status and problems of the existing domestic construction industry and the general institutional and socio-economic framework in which they will be working. The team should, as soon as possible, tackle the task of selecting and training local staff who will gradually, and certainly by the end of the early phase, replace expatriate staff. The aim of the contractor development agency should be to achieve a completely local staff within a reasonable period of time preferably not exceeding five years. The agency should, of course, be able to offer local staff more permanent employment opportunities that would help them in the development of their careers. In this connection, it can be envisaged that the agency might at some stage be transformed into a consulting organization that would provide its services against payment.

CHAPTER VII

FINANCIAL AND FISCAL PROVISIONS RELATING TO CONSTRUCTION

A. Financing

1. The financial facilities provided for domestic contractors included in a development program should be devised with a number of considerations in mind. First, most of these contractors are unlikely to have significant financial resources of their own during the initial and early stages of their business. While they therefore cannot be expected to invest much capital in absolute terms, they should be required to furnish equity capital sufficient to serve as an earnest of their commitment and their willingness to assume risks. Secondly, most contractors will not, during the early stages of the development of their business, be sufficiently creditworthy to obtain credit from normal financial institutions which at best are willing to assume the considerable risks involved in financing construction only for entrepreneurs with an established record of performance. Public funds will accordingly have to be made available to finance contractors for some time. However, provision should be made to transfer this responsibility as soon as possible to the institutions normally providing such business finance. Thirdly, the contractors' capacity to service loans is likely to be severely restricted during the initial stages of their development. Means must therefore be found to limit their need to borrow for working capital and equipment, and the terms on which they obtain financing will have to be determined in the light of reasonable expectations of their income. Fourthly, the majority of domestic contractors are likely to be deficient in the management of their financial resources. They will accordingly require considerable supervision and guidance in this respect. To provide the means for exercising this supervision, it would be advisable to make arrangements for channeling their receipts and disbursements as far as possible through a single account. Finally, the contractors should progressively develop the net worth of their enterprises, i.e. increase their equity in the business. Financing arrangements should accordingly be used to provide incentives for saving and for reinvestment of profits.

2. The financial requirements of contractors fall into two categories: sureties or guarantees for bidding, contract performance and contract maintenance; and capital required for working funds and for acquisition of necessary equipment. Each of these will be examined in turn.

Requirements for Bonds and Guarantees

3. In the course of our field investigations we found that bid security ranged from 5% of the tendered price in Iran and Ethiopia to

10% in Korea. In Iran the performance guarantee or bond required amounts to 5% of the contract price, in Korea and Ethiopia to 10% and 15%, respectively. Maintenance - i.e. the remedying of defects after the completion of the work - is ensured in Korea by a bond equal to 2% to 5% of the contract price. In the other two countries part of the progress payments due to the contractor is retained for this purpose. In Korea the necessary bonds or guarantees are provided by the Korean Contractors Financial Cooperative, but only in proportion to the shares of each contractor in this cooperative. In Iran guarantees are for the most part provided by banks; in Ethiopia, by insurance companies. We found that many new or relatively new construction enterprises had considerable difficulty in obtaining such bonds or guarantees except at the cost of very high premiums.

4. There will be no need for bid bonds in the early development phase of our time frame if, as we envisage, contracts to members of the proposed "development group" of contractors are awarded without competitive tendering. However, in the intermediate phase, when competitive bidding is introduced, bid security will become relevant. In this phase the creditworthiness of the developing contractor will probably still be rather limited, and will accordingly have to be carefully husbanded. Bid guarantees should not be required in excess of the minimum amount sufficient to discourage contractors from bidding without a serious commitment to undertake the work if it is awarded to them. We believe that a bid bond of around 1% or 2% of the tender price would be a sufficient guarantee of serious bidding, since the forfeiture of this amount would be a serious loss for most developing contractors.

5. Contract performance and "maintenance" can be ensured both by bonds or guarantees and by a system of retention payments. We believe that such guarantees or retentions should preferably be no more than 5% or, at most, 10% of the contract price. While the contractor should be allowed to opt either for a guarantee or for retention, we consider that retention of a percentage of the progress payments would on balance be more to the interest of contractors. A system under which half of the amounts retained would be returned to the contractor on the completion of the contract, and the balance on the expiration of the maintenance period, would in essence provide for "forced" savings. It would put at the disposal of the contractor at the times indicated fairly large amounts which, after provision for residual expenditures and debt service, would provide a "nest egg" for the financing of his continuing business.

6. We have given some consideration to the need for payment bonds. Such bonds are sometimes required of contractors to ensure that subcontractors are paid and that the employer does not become liable for such payments. Since we want to encourage the use of subcontractors, some provision for ensuring that these are paid promptly may well be necessary. However, bonds or guarantees need not be required for this purpose. Monthly progress payments to prime contractors can be made contingent on the

presentation of evidence that all suppliers and subcontractors have been paid in the preceding period. This is, in fact, the practice in a number of countries.

Requirements for Equity Capital

7. Before discussing the borrowing requirements of contractors, a few comments should be made on equity financing. We have already pointed out that new or relatively new contractors will generally not have the capacity to put up a large amount of equity capital. This does not mean that they should not be expected to provide some initial capital. No contractor can qualify as an entrepreneur unless he is willing to risk his own money. He can and should be expected to raise some money from his own resources and those of his extended family and friends. In each country where a development program is undertaken, the amount of initial risk capital required of a contractor will have to be carefully considered in the light of local conditions. In any event the amount should be large enough to serve as an earnest of the seriousness of purpose of the contractor. This can only be the case if its loss in the event of failure would be keenly felt by the contractor. In addition, we recommend that arrangements for financing the contractor provide him with an incentive to raise equity capital. This can be done by providing a portion of the financing in the form of "quasi-equity" capital, i.e. in the form of a loan that would not need to be repaid before the expiration of a defined period of, say, five years. Such "quasi-equity" financing could be provided in an amount matched to the volume of equity capital raised by the contractor himself. Borrowing and debt service requirements during the contractor's initial development phase would thus be reduced in proportion to the amount of equity and "quasi-equity" capital mobilized in this way.

8. Overtime contractors should be expected to increase their own capital resources. In classifying contractors by the volume of work they are qualified to undertake, one of the criteria should certainly be their net assets as reflected by the growth in the net worth (capital plus reserves) of their enterprises. Their liquidity or ability to mobilize cash necessary for their business should also be a factor. The "current ratio" (the ratio of current assets to current liabilities) or "net quick assets" (excess of quickly realizable assets over short-term liabilities) will be the best indicators of liquidity.

Measures to Reduce Borrowing

9. Various measures can be taken by the government, in its capacity as employer, to reduce borrowing requirements, and, thereby, the debt service burden of the developing contractor. The government can furnish some of the materials required in large quantities for carrying out the contract; and, indeed, we found that this has often been the practice in Korea. It can make arrangements, or liberalize existing arrangements, for paying contractors for materials already delivered on the site but not yet

incorporated in the work. Admittedly, this practice is open to abuse by the unscrupulous contractor and can be adopted only under conditions of close supervision of the work site by a government inspector. A more important way of alleviating the contractor's financing problem is to ensure that monthly progress payments are made promptly. Even a delay of one or two months can make a serious difference to a contractor with slender financial resources. We heard complaints about delays in payment everywhere. Frequently municipalities and other local authorities are the worst sinners in this respect. Government inspectors often do not act promptly to measure the work completed and certify it for payment, and the request for payment must pass through several ministries and agencies before it is honored.

Equipment Pooling

10. It is particularly important to reduce the need for investment in equipment, especially for contractors engaged in civil works. Our recommendation to allocate contracts in the initial phase without competitive bidding is prompted in large part by our desire to obviate or reduce excessive investment in equipment which is likely to be idle for a considerable part of the time. For the same reason we have deplored the exaggerated emphasis often put on the possession of equipment in the classification and qualification of contractors. It is envisaged that contractors should themselves invest only in equipment which could be more or less fully utilized and would rent the balance of equipment, including that needed only during peak work loads and that required for specialized work during only a limited time. This presupposes, of course, the existence of facilities for renting equipment.

11. Several types of equipment rental arrangements can be envisaged. It is possible to establish a government equipment pool or to broaden the functions of an equipment pool already maintained by a public agency for its own operations (for instance, the Imperial Highway Authority equipment pool in Ethiopia) to include rental. Efficient management of such a pool is likely to be the critical problem. Private management of a publicly-owned pool may be the best solution. The possibility of establishing private leasing companies should also be explored. Governments might encourage the establishment of such companies through a variety of incentives, including exemption of equipment from all import taxes^{1/} and exemption of the company from profits taxes for defined period. Finally, arrangements can be made for the partial pooling of equipment owned by contractors and subcontractors. Special measures can be taken to finance equipment for small contractors who can carry out much of the

^{1/} See, however, the caveat in paragraph 17 below.

earth-moving work for larger prime contractors. In Iran we were told that the existence of many small earth-moving subcontractors had contributed considerably to the fuller utilization of available equipment and had reduced the need of prime contractors to invest in such equipment. It is possible also to institute a system under which contractors would register, at some sort of central exchange, equipment which is temporarily idle and which they would be prepared to rent for a stated period of time.^{1/}

Employment of Used Equipment

12. The employment of used equipment as a means of reducing investment requirements should also be explored. We noted that foreign contractors may have an incentive to repatriate equipment after completing a construction job. They are usually permitted to bring in equipment free of duty but have to pay any applicable duties if they want to sell such equipment on leaving the country. When these duties are significant, we suggest that the government consider waiving them to provide an incentive to sell the equipment in the country. Appropriate safeguards to prevent abuse of this privilege might, of course, be necessary. Used equipment can also be bought abroad. However, domestic contractors will in general be unable themselves to determine the quality or remaining life of such equipment. The government might therefore examine the possibility of designating, on behalf of domestic contractors, reputable dealers who could be used as agents for the purchase and reconditioning of used equipment.

Terms of Financing

13. What should be the terms on which financing is extended to contractors included in the development group? Normally, although not invariably, the government as the employer makes an interest-free advance to the contractors for working capital. However, this is seldom enough, so that the balance, as well as the greater part of working capital required for carrying out private contracts, has to be borrowed. Advances and interest-bearing loans for working capital should normally be given for the execution of individual contracts and should provide for the recovery of principal and interest from the progress payments made to the contractor. However, the duration of loans for capital equipment should be related to the life of such equipment. In general, it would be advisable to make such loans somewhat shorter than the life of the equipment in order to induce the contractor to acquire an equity interest in the equipment that

^{1/} In India a somewhat similar arrangement is being tried to encourage the fuller utilization of capacity in small industries. Subcontract exchanges have been established. Small plants register with these exchanges the idle machining capacity they have and the types of components they can produce, and larger manufacturers are encouraged, similarly, to register with the exchanges their requirements for components the manufacture of which they are prepared to subcontract.

would exceed its "salvage" or "residual" value after it has been fully depreciated. This again would be designed to "force" some savings on the part of the contractor. The interest rate on all borrowing should, in our view, conform to the rates normally charged by existing banking institutions. The adoption of lower interest rates would make difficult the gradual transition to financing by such institutions which we envisage within the framework of our proposed development plan.

14. The primary security for all loans would be the contractor's payments for the work that he has been awarded. There is, of course, the danger that he may be unable to complete the contract or may experience cost overruns impairing his capacity to repay. The fact that the contractor will have the benefit of continuing advice and training should, to some extent, diminish these risks. In any event, few contractors are likely to have, in the early development phase, significant property to pledge as security. In this phase we do not believe therefore that such security should be required except in cases where the contractor can clearly furnish it. However, when equipment is financed we recommend that the financing agency retain ownership of the equipment until all payments have been completed. Even under these conditions repossession of equipment is often difficult because the equipment cannot be located. Annual licensing of all motorized construction equipment, which is now seldom the practice, would help to overcome this difficulty. It would have the additional advantage of enabling the government to determine more accurately the number of various types of equipment available in the country.

Special and Normal Financing Methods

15. We have already indicated that the risks of financing relatively new and inexperienced contractors are such that the banking institutions normally engaged in financing business are unwilling to assume them. We therefore believe that public funds should be made available to finance contractors during the early development phase. This has indeed been done in Kenya, but under conditions that have failed to ensure efficient management. While the agency in charge of contractor development is in the best position to assess the capacity of contractors which it is assisting, and loans therefore should be made only on its recommendation, we believe that the actual administration of loans should be handled by a separate, independent institution. As and when contractors develop and become more creditworthy, responsibility for their financing should be transferred gradually to the established, profit-making, banking institutions. We envisage that this should take place during the intermediate development phase. To make possible such a transfer the government will need to provide facilities for ensuring such institutions

against the credit risks involved. Initially, the proportion of risks so covered will probably have to be quite large - say, 70 or 80% - but it should diminish progressively as the banks develop confidence in their clients. Provisions for public insurance of credits have been successfully introduced in a number of countries, but generally apply only to credits extended to manufacturers. We believe it appropriate to provide similar insurance for credit granted to construction enterprises.

Establishment of Contractor's Accounts

16. In order to provide the requisite supervision of a contractor's financial management, we believe it important to require that all his receipts and expenditures be channeled through a single account in his name. Under such an arrangement all cash loans and advances and all receipts for work completed would be credited to this account. Disbursements for wages, salaries and materials from this account would be made only on the basis of payroll records and time sheets and of orders for materials certified by the supplier. Loan service would also be automatically debited to the account. In this way a comprehensive picture of the contractor's financial position would be available at all times. Such accounts could be kept with the agency charged with the administration of the public loan fund we have proposed for the initial development phase. However, for a number of reasons we consider it preferable that these accounts be opened in, and be administered by, regular commercial banks. Such banks would be more conveniently located in relation to the contractor's place of business. The contractor would become accustomed, at an early stage, to dealing with banks from which ultimately he should be able to obtain credit. He would become familiar with banking rules and practices. The banks in turn would be able to familiarize themselves with the development of individual contractors from the very beginning and to determine when and under what conditions they might be prepared to provide credit from their own resources. The banks would also be in a better position to advise contractors on problems of financial management and on the establishment and maintenance of records essential for cost control and financial planning. Initially, banks would probably have to be paid a small fee for the management of such accounts, but such a fee would presumably no longer be necessary as and when they themselves assume responsibility for financing the contractors. At that time, of course, the contractors would have to meet the normal security requirements of banking institutions, with such modifications as the availability of credit risk insurance may make possible.

B. Fiscal Treatment of Construction Enterprises

17. In the course of our field work we were unable to give much attention to tax measures relating to the construction industry. However, a few comments on this subject can be made. In general, we did not find the

level of import duties and taxes on equipment unduly high, except, occasionally, in the case of spares. We believe that imported equipment should normally be either exempt from, or subject to low duties. However, when the foreign exchange rate overvalues the currency, such a practice would excessively encourage the use of equipment at the expense of labor. In the taxation of profits, suitable allowances should be permitted for depreciation of equipment in accordance with its anticipated life. The rates of profits taxation should encourage the organization of construction enterprises as companies in which several or more partners would participate both in the share capital and in the management. This could be one way of discouraging "one-man" enterprises and of promoting the development of firms in which management responsibility is shared. In this context, consideration should also be given to the possibility of taxing retained profits at a lower rate than distributed profits. In many developing countries special tax concessions are made to new manufacturing ventures, usually in the form of profits tax exemptions or reductions of a predefined period. If a government really attaches importance to the promotion of a domestic construction industry, it should be prepared to extend the benefits of such concessions also to domestic construction enterprises.

CHAPTER VIII

A SUGGESTED FUTURE COURSE OF ACTION

A. Additional Research

1. Our terms of reference required us to make recommendations on additional research that might be undertaken on the various problems relevant to the development of domestic construction capacity and to suggest in particular what, if any, additional country case studies might usefully be made.

2. We make no pretension that we have thoroughly examined all the pertinent problems. We have tried only to identify and diagnose the key problems and to suggest how these might be dealt with in a general developmental framework. No doubt research on additional subjects would be valuable. Continuation of the research now under way in the Bank on alternative technologies of construction, with special reference to road construction, will be particularly useful. This research, focusing on methods and possibilities of achieving optimum combinations of equipment and labor, should help to determine the technology that might be appropriate for a particular country in the light of the actual prevailing relationship of the costs of labor and capital. Means of economizing investment in equipment might be further explored through research on various types of equipment pooling arrangements and on possibilities of employing used equipment. We have already mentioned the need for further study of the practical and economic limits within which construction work can be divided or "sliced" to bring it within the capacity of available domestic contractors. Similarly, we have indicated a need for more precise estimates of the foreign exchange savings that might be realized from the replacement of foreign contractors by domestic contractors and suggested that a thorough examination of the information bearing on this question might prove worthwhile. In the preceding chapter we also stressed the need to undertake a thorough canvass of possible sources of recruitment of personnel with the qualifications required for advising and training contractors in developing countries. Finally, in view of our finding that technical and vocational education has largely failed to meet the manpower requirements of the construction industry, it might be advisable to undertake a thorough investigation of the ways and means for making such education more relevant to the needs of industry.

3. We question, however, the usefulness of undertaking studies on the construction industry in additional countries. It is true, of course, that the limited number of countries in which we were asked to make studies can hardly be said to constitute a representative sample. The inclusion of additional countries, particularly those where domestic construction industries might be said to be in the intermediate phase of

development, might therefore be justified in principle. It might also be argued that the Bank Group should undertake a large number of country studies for the purpose of familiarizing itself with the capacity of domestic construction enterprises to carry out Bank-financed contracts. In the past, the Bank has often lacked sufficient information to verify claims that certain domestic contractors are qualified to tender for Bank-financed contracts. However, in view of the considerable amount of personnel and time involved, we doubt that additional country studies would be justified on either or both of these grounds. While it would be desirable for the Bank to improve its knowledge of the capacity of domestic construction enterprises in all developing countries, the requisite information can be built up more economically through the cumulative work of successive project missions, particularly if such missions focus at least part of their attention on this subject, and if the information they bring back is systematically recorded. Nor do we think that studies on the development of construction industries in additional countries would make more than a marginal contribution to a better diagnosis of the problems involved and of the ways in which these might be approached. More benefit is likely to be derived from a practical testing of the approaches we have suggested. We believe accordingly that major emphasis in the future should be placed on the elaboration and execution of few pilot development programs in carefully selected countries.

B. The Bank's Role in Developing Construction Industries

4. Before embarking on further steps, however, the Bank Group should consider carefully (1) what interest it has in the development of domestic construction capacity in the countries where it is doing business, and (2) what precisely should be its own role in developing domestic construction industries in such countries.

Definition of the Bank's Interest

5. The Bank Group can be said to have both a narrow and a broad interest in the development of domestic construction industries. Its narrower, but more specific, interest is derived from the fact that it finances several thousands of construction contracts each year. It is understandable that developing countries should want a growing proportion of such contracts to be awarded to their domestic construction enterprises and should accordingly press the Bank to adopt measures that would make this possible. The Bank, in turn, is seeking ways and means of achieving this objective without, however, a significant derogation of the principle that all countries, members of the Bank or contributing to its financing, should be permitted to compete for Bank-financed contracts, or of its interest, which it believes identical with that of the developing countries, in ensuring that such contracts are carried out economically and efficiently.

6. The Bank's broader interest in the development of domestic construction industries arises from its status as a development institution whose concern is not confined simply to the financing of a series of projects. It comprises the development process as a whole and all economic activities which may contribute to economic development. However, the constraints under which the Bank operates, particularly with respect to the availability of personnel, set a limit to the extent to which it can, in practice, concern itself with all sectors and problems of development. Priorities must therefore be determined, and only the Bank can determine what priority should be accorded to efforts to promote domestic construction industries. Here we have assumed, however, that the Bank will want to make such an effort.

Possible Approaches to Development

7. In theory, the Bank can promote the development of domestic construction capacity in two ways: (1) by adopting certain generally applicable policies permitting, for example, price preferences for domestic contractors; and (2) by assisting in elaborating and carrying out programs for the development of this industry in selected countries.

8. In principle, two types of price preferences are possible. One would be designed solely and specifically to offset the lower efficiency and higher cost from which a domestic construction industry might suffer in the initial stages of its development. Such a price preference would be akin to a protective tariff accorded to an "infant" manufacturing industry. The objective would be to shelter the industry in some degree from foreign competition until it has gained sufficient experience and has been able to achieve standards of productivity comparable to those of foreign construction enterprises. Another type of preference may be accorded to compensate for the fact that market prices of the various factors of production in a country may diverge from their real or opportunity cost. Such a divergence may arise in the pricing of the foreign exchange component of construction when the exchange rate is overvalued, or in the pricing of labor and equipment when market prices do not truly reflect the cost of these to the economy. If real (or "shadow") prices were used to cost labor and/or capital, this would, of course, not necessarily result in a price preference for domestic contractors unless labor and equipment were used in different proportions by domestic and foreign contractors. On the other hand, the pricing of the foreign exchange component in terms of "real" rather than market costs would give domestic contractors some price preference since contracts awarded to foreign firms would involve extra foreign exchange outlays for the remittance of at least part of profits and overheads.

9. The Mission understands that the Bank has been under considerable pressure from some countries to concede a general price preference to domestic contractors under one guise or another. However, we have

not considered the advantages or disadvantages of either of the price preferences mentioned in the preceding paragraph. In theory, we can see no objection to the use of "shadow-pricing" even where this results in some market price preferences for domestic contractors. In our view, the only question in such a case is whether the determination and application of shadow prices are feasible. However, a general price preference specifically designed to protect developing contractors is open to more serious objection. To be sure, the Mission has repeatedly emphasized that construction enterprises must be given adequate work experience during the initial stage of their development and that this cannot be done if, from the start, they have to compete on an equal plane with more experienced foreign construction firms. At the same time we recognize the danger that any measure of protection, whether through price preferences or through partial reservation of construction work to developing contractors, may become more or less permanent and may perpetuate inefficiency. We have tried to provide against this danger in two ways. First, we have stipulated that protection against foreign competition be limited to the early phase of development. For this phase we have chosen limited reservation of construction work rather than price preferences as a protective device. In the intermediate phase, we envisage the introduction of competition. We do not specifically recommend price preferences for domestic contractors during this phase, although modest price preferences might in our view be awarded during the period of transition to competition with foreign firms. Secondly, we have recommended that any measures to protect the domestic construction industry should never be adopted in isolation but only as part of a more comprehensive program, which would provide various forms of assistance and provide the means for raising the efficiency of the industry. The Mission therefore believes that the Bank would be ill-advised to agree to price preferences without an assurance that at the same time other measures are taken to tackle all the critical problems that inhibit the growth of an efficient domestic construction industry. In other words, if the Bank considers the promotion of domestic construction industries worthwhile, it should be prepared to help devise and apply a comprehensive approach.

Types of Bank-Sponsored Development Exercises

10. The Bank might get involved in a "development exercise" of the type we envisage in two ways. One would be through the utilization of a Bank-financed construction program or series of projects as a vehicle for developing domestic contractors who are qualified or might be qualified to participate in the construction involved. This has, in fact, been the course adopted in the recent (June 1962) IDA Credit for financing the Fifth Highway Program in Ethiopia. Under this Credit, financial and training assistance will be provided to local contractors, but no contracts will be specifically reserved to them since the principle of competitive bidding has been retained. Other Bank-financed projects or programs, such as school construction programs might also lend themselves to this approach. The other method of providing Bank assistance would be to

sponsor, and participate in, a program for developing, in a particular country and for a defined period, the construction industry as a whole. Each method has some advantages and disadvantages. The first has the advantage of a specific focus on a series of construction projects in which the Bank Group has a financial stake. The Bank's commitment would be automatically limited in scope and in time. However, this very limitation is also a disadvantage in that it would exclude from the scope of the development exercise most of the construction work that domestic contractors might actually or potentially be qualified to perform. The second method would be more comprehensive and, if successful, would therefore have a greater impact. It could be applied to the development of a domestic construction industry even when the latter is only in the early stages of development and has as yet little or no capacity for participating in Bank-financed construction work. However, the very scope of the second method of approach carries with it its own difficulties, and the extent of Bank involvement would inevitably be greater. While the Bank Group itself must take the necessary decisions, the Mission would recommend that it test the feasibility of both approaches in a few carefully selected countries.

Selection of Countries for Pilot Development Programs

11. The countries which are singled out for a development exercise or pilot program should be selected on the basis of (1) the commitment of the government to the promotion of domestic construction capability, (2) an assessment of the construction market, and (3) the current state of development of the construction industry. The commitment of the government would be a particularly important test, if a more general development program in accordance with the second method of approach mentioned in the preceding paragraph is to be launched. The government would have to provide evidence that it understood the implications of such a program in terms of construction planning and phasing, in terms of changes in contracting procedures and contract administration, and in terms of its share in any financing and training inputs that may be involved. An assessment of the actual and future construction market would be highly desirable as a means of selecting countries qualified for the second and broader approach. The projected market should be large enough to provide sufficient scope for the development of a domestic construction industry. On the other hand, it would be difficult to undertake a pilot program in a country that is large in terms of both its market and area unless in that case, the program could be confined to a more limited province or state or could focus on the employment of a defined construction program as a vehicle for developing domestic contractors. In principle, it would be preferable to select countries where construction demand is growing rather rapidly and opportunities for greater participation by domestic contractors can be developed without seriously affecting, in the period immediately ahead, the possibilities of further development of business by foreign contractors who are more or less permanently resident in the country. The current state of development

of the domestic industry might also be a relevant criterion. The experience gained from pilot programs would be more useful if the countries selected included construction industries at different stages of development, including both the "early phase" and the "intermediate phase."

C. Planning of Pilot Programs

12. Once the countries have been selected by agreement between the Bank and the government involved, the pilot development program will have to be carefully prepared. The Bank will have to organize a mission for this purpose, again in agreement with the government. Such a mission will first of all need to make an assessment of the construction market and its prospective evolution. Construction demand will have to be analyzed in considerable detail, with a proper disaggregation of demand into various types of construction activity, for a limited period of, say, five years, and in terms of a broader, global perspective over a longer period of time. If this assessment cannot be made in sufficient detail for the limited period by the mission itself, the mission will have to prescribe guidelines which will enable the authorities responsible for planning investment to arrive at the necessary assessment as soon as possible. The mission's next task would be to analyze the scope and capacity of the domestic industry in terms of the actual and potential capability of domestic contractors for undertaking certain types and amounts of construction work. The market constraints will then have to be related to the possibilities of developing a domestic industry of a given size and structure. The third task will be to determine the nature and content of the development program. This can be developed with the aid of the general framework of approach we have outlined in this report, with the explicit understanding, however, that the suggestions we have made about methods of handling the various elements of the program should be adapted and changed to suit the specific conditions and problems and the institutional structure found in the country.

13. With reference to this third task, the mission might well group its recommendations in two categories. One could relate specifically to the criteria under which contractors would be qualified for an integral program of special assistance, and to the specific types of assistance which might most appropriately be provided to such contractors under the auspices of an autonomous public contractor development agency. Within the framework of the guidelines we have provided, the mission could indicate the forms such assistance should take, including provision of work experience, advice and training, and financing. Another set of recommendations could focus on the policies and measures which the government should take with respect to the construction industry as a whole. These would relate to planning and phasing of public construction, modifications in the terms of government construction contracts, possible improvements in project design and specifications, the application of more

equitable criteria for government supervision of construction work, the adoption of more appropriate means for resolving contract disputes, the institution of more effective arrangements for preemployment training and education of the professional, subprofessional and skilled labor personnel required for the construction industry, and the like. Such measures could in large part be implemented independent of the special assistance to be given directly to the prequalified group of developing contractors, though, as we have indicated elsewhere, changes in the terms of contracts, particularly as they bear on the risks to be assumed by the contractor, should be adjusted to the development status of the contractors who are being aided.

14. The final task would be to devise methods for implementing the program and to estimate its cost. Discussions will have to be held with the various ministries and agencies that will be involved in execution of the program. Ways of allocating responsibilities for interrelated parts of program - construction planning and phasing, contract allocation and administration, financing, and training - and of enlisting organized participation by the contractors themselves will have to be considered. It would manifestly be undesirable to vest all these responsibilities in a single organization. However, it will be necessary, in our view, to provide for a separate agency that would be in charge of contractor development. This agency should be responsible for (1) selecting the contractors that would be included in the assistance program, (2) procuring construction work suited to their capacity, (3) providing the necessary formal and informal training, (4) recommending contractors for financing, and (5) assisting participating contractors to form an association that could take an active part in carrying out the program. The economic planning agency of the government will presumably be responsible for assessing and planning construction demand in collaboration with all government agencies and public authorities initiating construction projects. The Ministry of Works or a similar agency might be charged with the advance preparation of annual construction plans on the basis of which it would, in cooperation with the contractor development organization, select the amount and type of work best suited to the capacity of the contractors included in the programs. The Ministry of Works and the contractor development agency would probably also have to be given joint responsibility for working out in detail the content and terms of the contracts under which work would be awarded, and the appropriate provisions for administering and supervising such contracts. Suitable arrangements will also need to be devised for the administration of the special fund or funds that may be necessary for financing contractors or for insuring credits to contractors.

15. The role which the contractors themselves should play in carrying out the pilot program merits serious consideration. Much of the program's success will depend on the extent to which contractors develop a strong sense of participation and involvement. An association comprising all the contractors included in the program will probably be the best vehicle for

ensuring this. Initially, such an association should probably only have a consultative role. It would be a forum in which the contractor development agency would explain its plans and methods for the purpose of obtaining the cooperation and reaction of the members, and in which the contractors should be encouraged to express their response to the program and make proposals to improve its relevance to their needs. Gradually, as and when the association demonstrates its competence and sense of responsibility, it might be given a greater share in the determination and execution of the program. The past experience with contractors' associations indicates that they often become a group interested simply in presenting demands to, and obtaining favors from the government rather than in playing a constructive role in improving the standards and performance of the construction industry. Whether this danger can be avoided will in practice depend largely on the skill with which the contractor development agency will handle its relations with the contractors involved.

16. Careful attention will have to be given to the organization and staffing of the contractor development agency. The latter must be enabled to determine which contractors merit assistance, and to eliminate those who fail to demonstrate their capacity for development on the basis of objective criteria. To this end it must have the appropriate degree of administrative and financial autonomy. The size and composition of its staff will have to be determined. For this purpose the preparatory or planning mission will have to estimate how the number of assisted contractors and the type and amount of work they might be expected to undertake are likely to develop over the period of the pilot program, and to determine the kinds of problems on which development assistance will have to focus. Staff requirements will have to be phased in accordance with the projected development of the assistance program. The availability and qualifications of local personnel will need to be investigated in order to determine the type and number of staff members that will have to be recruited abroad.

17. The preparatory mission must prepare an estimate of the costs of the pilot program in terms of a budget projected over the proposed duration of the program. The largest outlays will presumably be for personnel of the contractor development agency and for the funds required to finance contractors. The amount of personnel expenditures will depend not only on the size and qualifications of the staff, but, above all, on the extent to which staff will need to be recruited abroad. The volume of contractor financing will be determined by the value and type of work the contractors are expected to handle and the form which the financing is expected to take, i.e. whether the financing will be provided directly from a special fund or indirectly through the insurance of bank credits. It is difficult to give an advance indication of the average annual budget that might be required, since this will obviously be determined by such factors as the number of contractors to be assisted, the amount and types of assistance they will need and the proportion of personnel that will have to be recruited abroad. The National Construction Company in Kenya,

which has on the average been working with about 40-50 small contractors, has an annual operating budget equivalent to about US\$460,000, including the contributions from the Norwegian Government to the salaries of 11-14 Norwegians. This excludes, however, the rather heavy losses in loan funds that have been sustained owing to shortcomings in the administration of the program.

18. Finally, the preparatory mission should make recommendations on the duration of the pilot program. In this connection two considerations should be kept in mind. A pilot program is by its very definition experimental in character. Its efficacy, particularly in terms of the benefits it might yield in relation to costs, cannot be accurately predicted. A long-term commitment to such a program would accordingly be inadvisable. On the other hand, it must be realized that significant results cannot be achieved in a short time. The contractor development agency will probably need an initial period of 6-12 months to work out a detailed plan of action, select the first group of contractors and initiate its developmental assistance. An additional period will be needed to test and revise the methods initially employed. In the light of these considerations we are inclined to believe that a five-year program will probably be appropriate.

19. If the preparatory mission is to do its work adequately, it must be prepared to spend a minimum of three months in the field. Much of its time will have to be devoted to gathering data which are not readily available. To become familiar with the capacity problems and limitations of existing contractors, many time-consuming discussions with contractors and visits to construction sites will have to be undertaken. The views of government agencies and ministries concerned with economic planning, with financing and with the various aspects of the whole construction process will have to be considered. A wide range of problems will need to be explored.

D. Implementing the Program

20. After the mission has completed its work and presented its recommendations, the Bank and the government will have to consider the report and their respective responsibilities for its implementation. The two parties will then have to enter into discussions for the purpose of agreeing on the program and any modifications, and on the contributions which each would make to its realization.

Bank Responsibilities

21. The contributions that the Bank Group might be expected to make to the program can be listed under the following headings:

a) Administration - The need to protect any program against political pressures that will interfere with its objective administration has been repeatedly stressed in this report. The Bank should accordingly insist that the agencies charged with financing and with contractor development are given the authority and independence which would enable them to operate in accordance with objective criteria. The Bank may also have to require that the director in charge of contractor development be named in agreement between itself and the government.

b) Financial assistance - The Bank Group's contribution to the cost of the program might cover all of the foreign exchange cost of the foreign personnel required and part of the funds needed for financing contractors participating in the development program.

c) Technical assistance - While the Bank Group has been generally reluctant to assume responsibility for finding and making available foreign personnel required for technical assistance functions, particularly in view of the activities of other UN agencies in this field, we believe that it should in this case carefully canvass itself the possible sources of recruitment and make every effort to ensure that personnel of the right caliber are found. The success of any pilot program will in considerable measure depend on the qualifications of the foreign personnel assigned to it.

d) Modification in Bank policies and practices - If, as we recommend, a pilot program should provide that construction work of a certain type and volume should be reserved to the selected group of contractors and awarded without competitive bidding in order to provide them with the requisite learning experience and continuity of work in their early development phase, the Bank Group should be prepared to agree to the inclusion of Bank-financed contracts of the appropriate size and type in the reserved category. This will entail, of course, an exception to the principle of competitive bidding. However, this exception is unlikely to be very significant in terms of the amount involved. It will need to be made only to the limited extent that an adequate volume of work will not be available otherwise. Only a few types of construction work financed by the Bank Group, such as school construction, small and simple road contracts and other minor civil works of this type, are likely to fall within the capacity of contractors who are still in the early phase of their development. As contractors move into the intermediate development phase, we do not expect that contract reservation will be necessary. In this phase we expect contracts to be let after competitive tendering which would be open also to foreign contractors whenever the construction project is financed from external sources. The Bank Group can then make a contribution by dividing the construction work involved in any development projects it finances as far as feasible into separate parts that would be within the capacity of developing domestic enterprises to construct. It might also consider whether, during this phase, it could agree that a modest price preference be given to domestic contractors in awarding work by competitive tendering.

e) Periodic evaluation - Since it is assumed that the Bank Group will in essence be a partner in carrying out a pilot program, it will need to participate also in periodic evaluations of the program and in the formulation of any modifications that may as a result prove to be necessary.

Government Responsibilities

22. The responsibilities which the government would presumably have to assume under a pilot program can in turn be summed up under the following heads:

a) Administration and financing - The government would need to agree to the arrangements for ensuring effective autonomous administration of certain critical parts of the program as outlined in the preceding paragraph, and commit in advance its share of the financing required. It will have to provide facilities for recruiting the qualified local personnel needed to staff the contractor development agency, including long-term secondment of appropriate government personnel to this agency.

b) Construction planning and continuity of work - The government will have to take the measures for planning and phasing construction work and for reservation of contracts that are recommended as necessary to ensure developing contractors continuity of work and learning experience.

c) Project design and specifications - Efforts will need to be made to modify and simplify design standards and specifications in accordance with concepts of value engineering. Similarly, methods of supervision may have to be revised to ensure substantial rather than literal conformity to specifications.

d) Contractual arrangements - The government should undertake to modify the content and terms of construction contracts to accord with the recommendations on the appropriate division of risks and responsibilities between the employer and contractor, and to provide for rapid and equitable settlement of disputes regarding contract performance and execution. It should commit itself also to expedite as far as possible procedures for measuring, certifying and paying for construction work completed.

e) Contractor performance - The government should help the contractor development agency to compile adequate records of contractor performance and to support this agency's efforts to enforce adequate performance standards by refraining from awarding contracts to contractors whom the agency considers unqualified.

E. Concluding Observations

23. The Mission would like to emphasize once more the experimental character of any programs designed to develop domestic construction industries. The problems involved are not difficult to identify and diagnose.

Sound prescriptions, however, are difficult, since there is little experience of deliberate and coherent efforts to develop this industry. To our knowledge, only Kenya has had a program focusing specifically on the development of domestic contractors; and while this program has by no means been entirely unsuccessful, it provides a better guide to the pitfalls that should be avoided than to the choice of measures likely to prove successful. The need for testing and evaluating approaches to the development of the construction industry under various conditions is therefore clear; and a number of pilot programs would provide the means for meeting this need and assessing the costs and benefits which at this juncture are difficult to predict.

24. One final observation must be made. Even if pilot programs demonstrate the feasibility and benefits of the approach to the promotion of construction industries outlined in this report, this does not mean that comprehensive development programs of this type can and should be launched in many developing countries. Since considerable resources are required for such a development effort, it must be demonstrated that the development of a domestic construction industry merits sufficient priority. In many cases such a priority may be difficult to justify. In small and poor countries the limited demand for construction will not warrant efforts to develop a diversified construction industry. At best, a limited effort to improve the efficiency of the existing indigenous building industry (as distinct from the broader construction industry) may prove worthwhile. In other countries measures falling considerably short of the comprehensive program we have elaborated may suffice to provide the necessary stimulus to the development of the construction industry. For example, there may already be a more or less adequate number of contractors who are inherently capable of doing a large volume and broad range of construction work, but who are denied sufficient opportunities for development by factors beyond their control. Such contractors would presumably have no urgent need of a program of special assistance administered by a contractor development agency. What may be required instead are new government policies and measures. Perhaps the government has permitted the industry to become overcrowded by failure to maintain a strict system of prequalification and classification of contractors, thus making it extremely difficult to obtain the continuity of work essential for the development of sound construction enterprises. Or the government may have discouraged the industry by insisting on unreasonable contract terms, by maintaining arbitrary standards of supervision, by denying contractors access to needed financing, etc. The Mission stressed at the outset that it was not attempting to write a general prescription for the promotion of construction industries in all countries. It has sought to consider in an integrated fashion all the elements that should be considered in the development of such industries. But that does not mean that all of these elements will require attention in each country or that they will all be of equal relevance. The focus and scope of a program or set of measures in a specific country can only be determined in the light of a detailed analysis of the particular conditions and problems of such a country.

Abbreviations Employed

- E - Employer or Client of Contractor
- C - Contractor
- SC - Subcontractor
- PC - Prime Contractor
- LC - Local Contractor
- FC - Foreign Contractor
- FRC - Foreign Resident Contractor
- LSC - Local Subcontractor (of local nationality)
- LPC - Local Prime Contractor
- FNRC - Foreign Non-Resident Contractor
- JFLV - Joint Foreign-Local Venture (either FC or SC)

ANNEX

DEVELOPMENT OF THE CONTRACTOR

IN TERMS OF HIS

QUALIFICATIONS, CAPABILITY, CAPACITY TO BEAR RISK

OVER THE DEVELOPMENT TIME FRAME

Subject	DEVELOPMENT PHASE		
	Early	Intermediate	Late
	<u>Ranking of Qualifications in Terms of Relative Importance</u>	<u>Ranking of Qualifications in Terms of Relative Importance</u>	<u>Ranking of Qualifications in Terms of Relative Importance</u>
I. Qualifications of Contractor - Entrepreneur (other than educational)			
A. Entrepreneurial and managerial skills (character of entrepreneur)	1. Motivation (B) Entrepreneurial and managerial skills (A)	1. Performance record (E) 2. Entrepreneurial and managerial skills (B)	1. Performance record (E) 2. Qualifications and size of staff (F)
Understanding of, and willingness to undertake risk	2. Willingness to risk own resources (D1)	3. Financial strength (D2)	3. Entrepreneurial and managerial skills (A)
Ability to innovate (receptivity and responsiveness to new methods)	3. Concentration on contracting business (C)	4. Concentration on contracting (C)	4. Concentration on contracting business (C)
Organizational ability - (capacity to mobilize and plan factors of production)	4. Qualifications and size of staff (F)	5. Qualifications and size of staff (F)	5. Possession of plant and equipment (G)
B. Motivation	5. Performance record (E)	6. Possession of plant and equipment (G)	6. Willingness to risk own resources (D1)
Consultant	6. Financial strength (D2)	7. Motivation (B)	7. Motivation (B)
Ability to define objectives and means of attaining them	7. Possession of plant and equipment (G)		
C. Concentration of entrepreneur on contracting business			
D. Financial capacity			
1. Willingness to risk own resources (owner's money or owner's equity)			
2. Development of financial strength or creditworthiness			
E. Performance (work history or experience of contractor-entrepreneur and his firm)			
F. Professional qualifications and size of entrepreneur's staff			
G. Possession of plant and equipment			
II. Minimum Educational Qualifications for New Entrants into Construction Contracting			
A. Conventional building	1. formal schooling 2. practical experience	Primary school Practical experience as artisan or as businessman	Secondary school Same as early phase
B. Modern building and civil engineering	1. formal schooling a. technician or engineer-entrepreneur b. business-type entrepreneur 2. practical experience a. technician or engineer-entrepreneur b. business-type entrepreneur	Secondary school with complementary training as technician Secondary school Previous construction-related experience as employee in government or in construction or consulting engineering firm Previous experience in medium or large business enterprise	Same as early phase { Same as early phase { Same as early phase { Same as early phase { Same as early phase
III. Development of the Contractor-Entrepreneur and his Staff through Training			
Degree of focus in training on:	<u>Conventional Building</u> "Existing" Contractors	<u>Primary & Initial Emphasis</u>	<u>Secondary and Growing Emphasis</u>
A. Methods of training:			
1. Informal (man-to-man advice)		Focus on informal training of contractor on concrete site problems (B3b., B3c., B3d., & B3e., with some attention to B3a.)	Formal training focused on contractor-entrepreneur with principal stress in subject matter on B1 and B2 & growing attention to B3a & B3e (1). Increasing emphasis on training of staff, such as clerk-bookkeeper & foreman.
2. Formal or structured training (short classroom courses or seminars and group demonstrations)			To the extent that special training program continues, same general emphasis with respect to focus and content of training; for contractors with growing volume of business (increasing number of contracts) special emphasis on B3a., B3b., B3e.(2) and B3f.
B. Subject matter:			Special training program presumably discontinued; facilities for upgrading business management skills presumably available.
1. Achievement motivation			
2. General appreciation of management problems			
3. Special problems of construction management			
a. estimating and pricing			
b. record-keeping (for cost control & documentation of receipts and expenditures)			
c. understanding of drawings and specifications			
d. programming or scheduling of work			
e. financial planning for (1) project (2) enterprise	"New" Contractors	Focus on formal training of contractor with stress in subject matter on B1 & B2.	As contractor starts work, combination of formal and informal training with greater emphasis, in terms of subject matter, to B3 and B3a.
f. personnel management and training			
4. Construction techniques or technology			
a. construction methods			
b. equipment problems			
C. Locus of problems			
1. Office			
2. Field or site			
D. Persons to whom training should be directed			
1. Contractor-entrepreneur	<u>Modern Building & Civil Eng.</u> "Existing" Contractors	Focus on informal training of contractor equally on office and site problems and stress, with respect to subject matter, on B3 and B3a.	Supplementary focus on contractor's staff Supplementary formal training on a range of problems included under B3.
2. Contractor's staff			To the extent that special training program continues, same general emphasis with respect to focus and content of training; for contractors with growing volume of business (in terms of number and size of contracts), increased attention to B3a, B3b, B3e (2), B3f, and B3h.
	"New" Contractors	Focus on formal training of contractor-entrepreneur on subjects B1. & B2. primarily as screening device.	As contractor starts work, focus on informal training in: subjects B3. and B3a, both on site and in office

SUBJECT

Degree of Emphasis on Method

Intermediata

Degree of Emphasis on Method

Early

High

High

High

High

Medium

Medium

Medium

Medium

Low

Low

Low

Low

High

High

High

High

Medium

Medium

Medium

Medium

Low

Low

Low

Low

IV. Relative Emphasis on Methods of Estimating Incomplete Contractor-Entrepreneurs

- A. Responsiveness to training
 - 1) Reciprocity b., and ability to apply advice
 - 2) Participation in formal training:
 - a) willingness to attend course;
 - b) response in courses.

- B. Performance over a series of contracts-- ability to execute contracts in terms of meeting requirements with respect to time and acceptance of work

- C. Financial Performance
 - 1) Inability to increase financial resources and result in losses
 - 2) Failure to get prompt payments to suppliers, subcontractors, or credit institutions
 - 3) Outright bankruptcy

V. Methods of Awarding Contracts and Degree of Competition

- A. Prior breakdown of work to be contracted into major or prime contracts and subcontracts with clear definition of responsibility
- B. Ability of LFC's and LSC's (contract slicing)
 - 1) Conventional building (simple, single-story, low-cost houses, commercial buildings, schools and clinics; simple storage and factory sheds providing only shelter for light machinery and stored materials and goods)
 - 2) Horizontal slicing:
 - (a) prime contracts;
 - (b) subcontracts for:
 - (i) electrical work
 - (ii) plumbing work
 - 3) Vertical slicing-- In case of building programs involving considerable number of separate units (schools, housing, etc.) contracts are awarded by lot or into contracts for single units of varying sizes.
 - 4) Modern building (characterized by, among others, lack of standardization of units, mass construction, use of reinforced concrete, more sophisticated foundation work, more complex wall systems and higher-grade finishes, finishes better, construction and complex factory contractors)

- B. Sub-contractors (other than suppliers)
 - (1) site work
 - (2) structural work
 - (3) masonry work
 - (4) carpentry and joinery work
 - (5) roofing
 - (6) electrical work
 - (7) plumbing work
 - (8) heavy construction, air conditioning (HVAC)
 - (9) drainage
 - (10) vertical transportation (elevators, dumb waiters, etc.)
 - (11) finishes

- C. Civil engineering - example: road construction
 - a) High-standard roads:
 - (1) vertical slicing;

- (2) horizontal slicing
 - (a) clearing and grubbing
 - (b) grading, including formation and placement of sub-grade with rock cuts with rock cuts

- (3) drainages (pipe and box culverts) without rock cuts

- (4) bridges

- (5) Pavement
 - (a) sub-base (natural, selected material, crushed stone or crushed gravel involving crushing and screening, transport, spreading, and compacting)
 - (c) wearing course asphalt-concrete concrete

- B. Medium-standard roads

- (1) vertical slicing
 - (a) items other than paving (same as above)

- (b) pavement - sub-base (same as above) brick setting water-bound macadam asphalt macadam

- C. Low-standard (raw to market) gravel roads--grading of tracks (involving grading, staking and compaction of embankment and gravel topping).

Generally within capability of LC's, with possible limitation on total volume of business LC's can handle; nomination of LSC's by S.

Slicing with view to bringing maximum volume of work within LC capability.

Little or no importance to be attached to slicing.

All within capability of LC's; selection of SO's left to PC.

Slicing into progressively larger contracts and wider range of contracts terms demands that local building industry develops.

Presumably little or no LFC capability.

Possible LSC capability in part of this work

Possibility of requiring FFC's to use owner-nominated LSC in one or more of above categories under conditions that LSC provided performance bond in favor of both owner and LFC and owner assumes responsibility for cost of repairs or replacement of work in event of increased costs incurred by FFC as result of failure of LSC and delays caused by replacement of LSC.

Sufficient LFC capability, combined, possibly, with JFLV capability, except where constraints of local market have made development of LFC capability invariable.

Complete LSC capability.

No employer-designated SO's.

Increased use of owner-nominated LSC's in light of growing numbers and capability of LSC's.

Generally no LFC capability where there is no horizontal slicing.

Some LC capability as FC or SC.

No LC capability as FC or SC.

Possible LFC capability as FC or SC.

Generally done as part of whole road contract; subcontracts for larger pipe and box culverts possible if LSC capability exists.

Possibly use LSC for bridges requiring no pile driving.

Some LFC and LSC capability; LSC capability also possibly associated and transport of little LSC or LFC capability except for material supply.

No LC capability.

Some LFC capability.

LFC and LSC same as in case of high-technology roads

Some LFC and LSC capability.

LC capability provided minimum equipment can be supplied.

Developing LFC capability and JFLV capability within framework of generally larger contracts.

Same as in early phase, but with generally increasing capability.

Developing LC capability; also JFLV capability. Increasing LC capability.

Same as in early phase.

Developing local capability for bridge construction with difficult foundation conditions

Developing LFC and LSC capability

Development of limited LC capability and possible JFLV capability as conditioned by market constraints.

Developing LFC capability and, possibly JFLV capability.

Developing LFC and LSC capability.

Sufficient LC capability.

Horizontal slicing for the purpose of encouraging LFC's and LSC's discontinued; general road contractor free to determine type of work to be subcontracted. Vertical slicing subcontractors. Reference to encouragement of LC's.

	Early	Intermediate	Late
B. Methods of awarding contracts (including subcontracts to employer-nominated contractors) and conditions of competition by FC's			
1. Building			
a. Type of contract and method of award for LC's selected for development	Cost plus fixed fee within overall price ceiling fixed by owner; incentive to contractor in form of sharing in savings arising from difference in actual cost and ceiling.	Invitation to tender to selected contractors with award of contract to tenderer whose bid is closest to mean after elimination of highest and lowest bids. Guidance to tenderers by employer through publication of employer's estimates of costs of major items of work.	Award of lump-sum (or unit-price) contract on competitive tender open to all qualified contractors without reference to nationality.
b. Type of protection against competition	Reservation to domestic contractors of contracts (by type, size and total volume of contracts, taking into account results of slicing) determined to be within actual or near-term capability of LC's whose development is being promoted. No competition by other LC's or FC's for this reserved group of contracts.	LC's protected only against consequences of extremely low bidding. Discretionary inclusion of FC's in list of invited contractors in case of contracts financed from local financial resources; compulsory inclusion of foreign contractors in extensive list of invited bidders in case of externally-financed contracts. Method of awarding contracts identical for foreign and local bidders.	
2. Civil engineering			
a. Type of contract and method of award for LC's selected for development	Unit-price contract concluded with designated local contractor on basis of prices set by owner.	Unit-price contract concluded on basis of tenders by invited group and awarded by same method as in the case of building in intermediate stage. Some guidance to tenderers through publication of employer's estimate of cost of major items of work.	Award of unit-price contract on the basis of competitive tender open to all qualified contractors without reference to nationality.
b. Type of protection against competition	Identical as in the case of building.	Identical as in the case of building.	
VI. Employer's Responsibility for Giving Certain Types of Information and Guidance to Tenderers/Contractors			
A. Bills of quantities	E to furnish. E to furnish in order to help contractors to control costs.	E to furnish. C to estimate though employer might furnish cost estimates on major items of work to guide C in preparing his bid.	E to furnish. C to estimate.
B. Estimate of unit costs			
C. Detailed project designs and specifications			
1. Form of specifications	E to furnish. C to follow owner-prescribed method or recipe.	E to furnish. C to follow owner-prescribed method or recipe.	E to furnish.
a. method specifications-prescription of method of achieving end result such as recipe for concrete batching.			
b. end-result specifications-prescription of end result to be obtained, such as concrete of specific strength.	C not responsible for end result.	C not responsible for end result.)In most cases, C expected to achieve "end result" even if E indicates method.
D. Detailed drawings	E to prepare. E to prepare.	E to prepare. E still to prepare in many cases; transition to C responsibility.	E to prepare. C to prepare.
E. Design of temporary works (e.g. shuttering)			
F. Work plan or schedule (in form of bar charts, diagrams or critical path method)	E to furnish for guidance of C.	E to furnish for guidance of C.	C's responsibility.
G. Field engineering-- surveying			
1. Vertical and horizontal controls	E's responsibility.	O's responsibility.	O's responsibility
2. Working stakes-- points for line and grade	E's responsibility.	O's responsibility.	O's responsibility.
3. Setting out of work (batter boards, slope stakes, strings & chalk lines, points for grade)	E's responsibility.	Transition of responsibility from O to C.	C's responsibility
VII. Apportionment of Responsibility Between Owner and Local Contractor for Risks Other than Those of Competition			
A. Errors in bidding (withdrawal by contractor of low bid on basis of arithmetic error or revised judgment on difficulty or cost of contract) Penalty to be paid by contractor	Inapplicable because no competitive bidding.	Inapplicable to low bidder, but applied to contractor awarded contract in case of failure to accept contract (unlikely eventuality).	Except in case of demonstrated arithmetic error, forfeiture of bid bond, but with option (1) by low bidder to accept contract at price set by predetermined percentage of difference between lowest bid and second highest bid, (2) by owner to accept second highest bid.
B. Penalty for contractor's failure to complete contract in time (liquidated damages following acceptance of work)			
1. in case of single contract			
a. application of monetary penalty	Not applied.	Applied, but liquidated damages assessed at somewhat lower rate than generally applicable in the case of experienced FC's. Same as in early phase.	Liquidated damages assessed at rate prevailing for all contractors irrespective of nationality. Monetary penalty only.
b. application of non-monetary penalty	Applied in form of lowering contractor's qualification by size of contract one step.		
2. in case of defined series of contracts and where contractor is late in completing pre-determined number of contracts	Applied in form of loss of qualification for work for defined period.	Small monetary penalty on individual contracts, plus loss of qualification for work for defined period.	Monetary penalty on individual contracts as above.
C. Responsibility for payments for additional costs incurred before acceptance of work due to:			
1. Contractor's negligence			
a. extra or additional work	Contractor is not held liable.	Increasing shift of responsibility to contractor.	Contractor's responsibility.
b. interruption of work	Contractor's responsibility.	Contractor's responsibility.	Contractor's responsibility.
2. Normal or unusual weather conditions causing:			
a. interruption of work	Contractor's responsibility.	Contractor's responsibility.	Contractor's responsibility.
b. extra or additional work	Contractor is not held responsible.	Increasing shift of responsibility to contractor.	Contractor's responsibility.
3. Abnormal or unusual weather conditions (work interruption and extra or additional work)	Contractor not responsible.	Contractor not responsible.	Contractor not responsible.
4. Sub-surface conditions not clearly indicated by owner (extra or additional work)	Contractor not responsible.	Contractor not responsible.	Contractor not responsible.
5. Changes in design and specifications by owner or owner's agent (contractor not responsible for determining whether changes by owner's agent are properly authorized)	Contractor not responsible.	Contractor not responsible.	Contractor not responsible.
6. Contractor's failure to verify designs and drawings, including dimensions supplied by owner	Contractor not responsible.	Contractor not responsible.	Contractor not responsible.
7. Escalation of cost of materials, labor and equipment			
a. in building	No revision of ceiling.	Escalation to be allowed on appropriate basis such as construction cost indices.	Same as intermediate phase.
b. in civil engineering	Revision of ceiling to take into account escalation.		

SUBJECT

-4-

DEVELOPMENT PHASE

SUBJECT	DEVELOPMENT PHASE		
	Early	Intermediate	Late
<p>III. Appropriate Standards of Owner Supervision in Enforcement of Conformity to Contract Specifications, Strictness of Enforcement Standards (as measured by a scale ranging from 0, "lax"; to 5, "very strict") with respect to:</p> <p>A. Appearance for</p> <ul style="list-style-type: none"> 1. low-standard construction 2. high-standard construction <p>B. Quality of workmanship (in terms of anticipated magnitude of repairs and replacement in relation to projected life of project)</p> <p>C. Function (ability of completed construction project to serve its intended purpose)</p>	<p>1-2</p> <p>2-3</p> <p>2-3</p> <p>3-4</p>	<p>2-3</p> <p>3-4</p> <p>3-4</p> <p>3, 4, 5</p>	<p>3-4</p> <p>4-5</p> <p>4-5</p> <p>4-5</p>
<p>IV. Financial Provisions for Contracting</p> <p>A. Bonds or guarantees for</p> <ul style="list-style-type: none"> 1. Bidding 2. Performance 3. Maintenance 4. Payment <ul style="list-style-type: none"> a. by contractor to protect employer against letter's possible legal double liability for payment to both prime contractor and subcontractors and suppliers b. by contractor to protect subcontractors and suppliers against non-payment <p>B. Requirements for working capital and equipment capital</p> <ul style="list-style-type: none"> 1. Financial contribution required from contractor (risk or equity capital; financial capacity) 2. Methods of reducing financing requirements <ul style="list-style-type: none"> a. for working capital through: <ul style="list-style-type: none"> (1) contract advances by owner (2) provision of materials by owner under terms of contract, correspondingly reducing price of contract (3) payment by owner for materials (other than in (2), above) on site but not yet incorporated in project (4) prompt progress payments by owner b. for equipment capital through: <ul style="list-style-type: none"> (1) guidance to contractor in selecting most appropriate and economic equipment (2) use of second-hand equipment (3) encouragement of equipment leasing to meet need for specialised equipment and peaks in demand for general equipment. c. source of financing D. Terms of financing <ul style="list-style-type: none"> 1. Interest rate 2. Amortisation period for <ul style="list-style-type: none"> a. working capital loans b. equipment loans 	<p>Not applicable.</p> <p>Required, but with contractor's option to agree to retentions of part of progress payments to insure performance and maintenance.</p> <p>Not required.</p> <p>Not required, subject to presentation of evidence by contractor in connection with qualification for progress payments that subcontractors and suppliers have been paid in accordance with legal obligations in preceding period.</p> <p>Contractor to mobilise sufficient cash resources to signify willingness to take risks.</p> <p>Contract advances or provision for all working capital needs through single working capital loan.</p> <p>Possibility of employer employing certain standardized materials required in large quantities, such as cement and reinforcement bars.</p> <p>Employer responsible for such payments under conditions of strict site supervision.</p> <p>Employer responsible for setting up efficient system for measuring and certifying work completed and for payment; employer to pay interest on overdue payments at rate exceeding that at which contractor borrows.</p> <p>Early emphasis on acquisition of multi-purpose equipment, with leasing of specialised equipment.</p> <p>Possible establishment by government of agency for purchase of second-hand equipment abroad under contract with foreign agents responsible for purchase and reconditioning of such equipment; adoption of incentives to FNRC to leave equipment in country.</p> <p>Adoption of any or all of following:</p> <ol style="list-style-type: none"> (1) Government encouragement of private leasing companies. (2) Establishment of government-owned but privately-managed equipment pool. (3) Provision of access to government-owned maintenance pool for small civil engineering contractors and subcontractors. (4) Financing of earth moving-equipment for equipment operators capable of becoming earth-moving subcontractors. (5) Encouragement of equipment leasing among contractors through system providing for registration of temporarily idle equipment available for rent. <p>To simplify financing for contractor and to "socialise" risks of contractor financing, establishment of public fund (in autonomous public entity or entrusted for management to banking institution) which would be source of all financing, including contract advances (if any) and provision of banking or guarantee facilities and would serve as channel for employer payments to contractor, with appropriate retentions for loan service, repayment of contract advances, and insurance of performance and maintenance of contract.</p> <p>Application of rates practised by commercial banking institutions with public fund foregoing higher interest rate that would normally be justified by higher risk of financing contractors.</p> <p>Generally geared to duration of contract, but with possible provision of some quasi-equity capital in amount matching contractor's own risk capital and in form of long-term loan with grace period for interest and principal payments up to five years.</p> <p>Establishment of amortisation period of somewhat shorter duration than life of equipment in order to "force" savings by contractor in form of acquisition of equity interest in equipment.</p>	<p>Bond or guarantee to be furnished in amount sufficient to discourage contractors from bidding without real commitment to accept work at bid price.</p> <p>Same as in early phase.</p> <p>Possible institution of this requirement if employer exposed by law to double liability.</p> <p>Same as in early phase.</p> <p>Introduction of requirement that net quick assets of contractors bear some relationship to annual contract volume for which he is qualified.</p> <p>Same as in early phase.</p> <p>Same as in early phase.</p> <p>Same as in early phase.</p> <p>Employer responsible for setting up efficient system for measuring and certifying work completed and for payment; employer to pay interest on overdue payments at rate exceeding that at which contractor borrows.</p> <p>Same as early phase, but with contractors gradually acquiring broader range of equipment with expanding business volume.</p> <p>Same as in early phase.</p> <p>Same as in early phase.</p> <p>Transition to financing by established banking or insurance institutions serving general business community; establishment of special scheme, financed largely by government but with possible contributions from contractors to insure such financial institutions against major, but gradually declining portion of risks involved in making financial facilities available to contractors.</p> <p>Application of commercial rates of interest.</p> <p>Under terms normally set by existing commercial financial institutions as conditioned by availability of credit risk insurance.</p> <p>Under terms normally set by existing commercial financial institutions as conditioned by the availability of credit risk insurance.</p>	<p>Bid bonds same as those required of FC's.</p> <p>Required of employer subject to double liability under law.</p> <p>Same as in early and intermediate phases.</p> <p>Net quick assets requirement.</p> <p>Contract advances</p> <p>Identical provisions for all contractors irrespective of nationality.</p> <p>Identical provisions for all contractors irrespective of nationality.</p> <p>Same as in early phase.</p> <p>Same as in intermediate phase.</p> <p>No special provisions.</p> <p>Combined emphasis on (1), (4), and (5).</p> <p>Reliance on ordinary banking and insurance inst., without special credit risk insurance.</p> <p>Application of commercial rates of interest.</p> <p>Under terms normally set by existing financial institutions.</p> <p>Under terms normally set by existing financial institutions.</p>

SUBJECT

DEVELOPMENT PHASE

	<u>Early</u>	<u>Intermediate</u>	<u>Late</u>
3. Security required	(1) Primary reliance on assignment by contractor to financing institution of payments due under contract or contracts, supplemented in the case of equipment by financing institution until equipment is fully paid. (2) Secondary reliance on (a) co-signers or co-guarantors (b) mortgages on real property if available.	Same as in early phase, with part of security provided through credit risk insurance.	Requirements normally imposed by existing commercial financial institution.
2. Fiscal provisions applicable to contracting business			
1. Taxation of profits	Possible tax exemption of profits during first five years of contracting business. Where profits are taxed, generous provision for carrying forward losses as offset to future profits.	Same as in early phase.	No special provision.
2. Provision for carry-over of losses in taxation of profits	Low or no duties on imported equipment and spares unless foreign exchange rate is deemed overvalued.	Same as in early phase.	Possible continuation of same provision.
3. Import duties and taxes on equipment		Same as in early phase.	Same as in early phase.