BIDDING CONSIDERATIONS IN DEVELOPING COUNTRIES

By Edward J. Jaselskis,[1] Associate Member, ASCE, and Alfred Talukhaba[2]

ABSTRACT: Developing countries pose greater challenges to international construction contractors because of inherent risks such as government instability, shortages of adequately trained craftsmen, difficulty in acquiring needed materials, and lack of adequate infrastructure such as roads, bridges, harbors, and power generation facilities. The international construction market is continuously growing, and there are many opportunities for U.S. contractors to obtain additional work and improve profits. This paper describes characteristics of developing countries that should be of interest to any contractor considering projects in these parts of the world. Additionally, results from a study identify the top information requirements in 15 key areas, which architectural, engineering, and construction (AEC) firms identified. A discussion of characteristics of the construction environment in Kenya is provided as an example of bidding considerations in a typical developing country.

INTRODUCTION

New opportunities are increasing in the global market for U.S. contractors to obtain work in many parts of the world, especially the developing countries where there is a need for almost all types of construction (e.g., new electrical utilities, highways, hospitals, housing, and maintenance on existing infrastructure). Major events in the world, such as the collapse of the Soviet Union, the implementation of the General Agreement on Tariffs and Trade (GATT), and the North American Free Trade Agreement (NAFTA) are creating new contract opportunities for many architectural, engineering, and construction (AEC) firms. Acting on these opportunities can be beneficial to U.S. construction firms bringing in additional work and increased profits.

To take advantage of these opportunities, it is essential that U.S. AEC contractors obtain an appreciation for the unique characteristics of bidding projects in developing countries. This paper describes several key differences between developed and developing countries that should be of interest to any contractor considering projects in these parts of the world. Additionally, results from a study identify the top information requirements in 15 key areas that AEC firms identified. Finally, a discussion of characteristics of the construction environment in Kenya is provided as an example of bidding considerations in a typical developing country.

CHARACTERISTICS OF CONSTRUCTION PROJECTS IN DEVELOPING COUNTRIES

The modern world can be divided into three main categories based on location in the world, political affiliation, or overall wealth. The first world, or developed countries, includes the United States, western European nations, and the industrialized democracies of Japan and Israel. The second world consists of developed countries, but those that have not met the standards of the first world, such as China and Russia. The third world comprises those countries whose development in all areas is not as extensive as in the first and second world countries and primarily includes countries in Latin America, Africa, and Asia (Merriam 1988). In a sense, all countries are in various stages of development and can be considered "developing" countries. However, for purposes of this study, countries from the first and second worlds will be called "developed" nations, and those in the third world will be called "developing" nations. Developing countries share a common set of characteristics that represent their overall level of development. Some of the more important similarities are described in the following sections along with a discussion of how these characteristics affect the construction environment.

Government/Political Instability

Developing countries present a wide variety of ruling political systems: democratic, socialist, communist, and sometimes dictatorships. As opposed to governments in the more developed countries, governments in developing nations face serious problems that jeopardize their stability and continuity. They face political-economic conflicts that often defy peaceful resolution, conflicts between the private business interests and the state bureaucracy, conflicts between civilian and military authorities, and religious and ethnic conflicts as well (Wolf 1988).

Governments in developing countries directly influence the public construction sector by setting the rules for development and contractual relationships. Their influence is also felt in the private sector through policies and legislation regarding licenses and permits, sanitary and building codes, minimum wage rates, corporate taxes, rules on the importation of materials and spare parts, and terms and availability of financing for construction (Henriod et al. 1984). Contractors need to be aware of all legal and governmental requirements before agreeing to perform the work because this may change certain assumptions in their project execution plan. It is true that the construction industry in developed countries also is affected by the government/political institutions, but not as strongly as in developing countries. Contractors may need to accept greater amounts of risk and/or purchase additional insurance to cover for possible loss.

Low Standard of Living

The general standard of living in developing countries tends to be poor for the vast majority of people compared with that of the more developed nations. These living conditions and the overall economic strength of the countries are shown by total income, which accounts for less than 27% of the world's income, even though these countries represent almost 76% of the world's total population (Todaro 1985). Almost 40% of the population in developing countries lives in absolute poverty. Most of the time their income levels are insufficient for the provision of adequate nutrition; this situation is most critical for the poorest countries in south Asia and Sub-Saharan Africa (Todaro 1985; Nafziger 1984).

Literacy levels remain low compared with the developed nations. Much of the little education provided is ill-suited and

[1]Assoc. Prof., Civ. and Constr. Engrg., Iowa State Univ., Ames, IA 50011.

[2]Instructor, Univ. of Nairobi, Kenya, Africa.

Note. Discussion open until November 1, 1998. To extend the closing date one month, a written request must be filed with the ASCE Manager of Journals. The manuscript for this paper was submitted for review and possible publication on May 20, 1997. This paper is part of the ***Journal of Construction Engineering and Management***, Vol. 124, No. 3, May/June, 1998. ©ASCE, ISSN 0733-9364/98/0003-0185–0193/$8.00 + $.50 per page. Paper No. 15810.

often irrelevant to the development needs of the nation. This situation closely relates to the skill level, not only of the labor force, but also of management personnel in the construction industry (Wells 1986). For the less formal construction projects employing labor-based methods, this situation can be even more critical because of the high employment of unskilled personnel. For this reason, multinational contractors may need to provide special training programs for their work force before any substantial construction can commence.

Materials and machinery normally used for construction of projects in developed countries may not be readily available for third world nations. This is because of the limited production capabilities necessary to supply the industry with the appropriate quantity and quality of construction materials and equipment. For example, in the case of structural steel, only some shapes and sizes may be available. In the case of cement, the available types might not meet the more unique specifications required for specialized construction projects such as dams, airports, or high-rise buildings. Materials, electrical power, and fuel also may be of limited availability on certain construction sites because adequate transportation and distribution is lacking, the supply capacity is limited, or the commodity is totally unavailable in the country (Spence and Cook 1983). One common approach to remedy the situation is to use foreign suppliers to procure these resources; however, this solution is not suitable for every country because of large import restrictions by the local governments that protect inefficient local manufacturers or control the use of the foreign currency (Henriod et al. 1984).

Low Levels of Productivity

Levels of labor productivity are extremely low compared with those in developed countries. Physical health, poor dietary habits, low standards of personal hygiene, lack of experienced management, and, sometimes, over staffing of certain activities are partially responsible for the low productivity in developing countries (Simpson 1987). Furthermore, many of the laborers are uneducated and unskilled and may need to be trained and educated before they can become productive resources in the work force.

Technical capability of local contractors also is a consideration in third world countries. The appropriate technical capability of the local contractors in developing countries will depend on factors such as the volume and continuity of demand for different types of construction and the availability of necessary manpower. Discontinuities and fluctuations characterize construction demand in both developed and developing countries; however, this demand is even more volatile in the developing countries. For this reason, local contractors cannot maintain and develop permanent supervisory staff and skilled laborers, nor can they establish an appropriate fleet of basic equipment. Although clients of construction projects (at the federal or local level) may dictate the use of local contractors to do the work, in actuality, there may be very few qualified local firms for the job (Ruvkun 1981). Consequently, multinational contractors may need to provide training and assistance to these local contractors to help them complete their portion of the construction project.

A great majority of developing countries are located in tropical regions. For this reason, they experience climates in which the dominant construction problem is providing protection from extreme heat, torrential rain, or both. Extreme heat and humidity affect not only the production rates in developing countries, but also the soil qualities and the natural resources through more rapid deterioration. Production also is affected by these extremes in the form of workers with poorer health and in a diminished ability to engage in strenuous physical work. Some developing countries are located in mountainous terrain (e.g., Afghanistan, Pakistan, and some South American countries). This terrain puts these countries at the disadvantage of providing constant maintenance of roads because of landslides. Also, continuous traffic delays and road deterioration affect the delivery of materials and personnel to the construction site (World Bank 1981).

Staab (1989) describes unique characteristics encountered while working on a construction project in Somolia. He said that this environment presented critical problems related to dust, sand abrasion, high solar radiation, temperature extremes, soil conditions, water quality, corrosive environment, high wind velocities during the monsoon season, unavailability of construction equipment and materials in the host country, high attrition rates among skilled workers, and constant breakdowns of equipment. Moreover, Elinwa and Buba (1993) state that the cost of materials, fraudulent practices and kickbacks, and fluctuations of material prices are three of the most important factors leading to high construction costs in Nigeria. Contractors working in these locations may need to allow additional time to complete the project and increase their budgets to take into account many uncertainties presented by a developing country.

High Levels of Unemployment and Underemployment

In developing countries, the following two major labor problems exist: (1) Unemployment related to people who are able to work but cannot find jobs; and (2) underemployment related to people who are working in positions that are below their level of skill and training. These problems are becoming more critical; projections for unemployment in all developing countries in the year 1990 show an increase of 8.2% as compared with the 1980 figures, which showed an increase of 7.8%. The combined unemployment and underemployment projections for the same year could potentially affect 600,000,000 people (Todaro 1985).

Most construction projects in developing countries draw on the unskilled agricultural labor base not only for construction but also for operation of the completed facility. Therefore, a reliable supply of labor for large projects will depend mainly on the seasonal demand for agricultural laborers (Coukis and Grimes 1980). Many of the developing countries are devoted to promoting labor-based construction projects especially on the larger, more formalized projects. However, construction by this procedure even though providing social and economic advantages for the population in general, directly affects the quality and completion schedule of construction projects (Coukis and Grimes 1980). Another situation found in developing countries is the absence of organized unions and specific labor practices. This is even more critical when one considers that the Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA) requirements do not have to be met; thus, the safety and well-being of labor and the population in general are at risk (The Economist 1987).

Koehn et al. (1995) compare safety practices in the United States to developing countries. These researchers state that in a developing country such as India, comprehensive and universal safety regulations have not been developed. Construction workers are typically unskilled or semiskilled, poorly paid, temporarily employed, exhibit low productivity rates, and often migrate in a group from one place to another in search of work.

Project Financing Characteristics

Developing countries usually fund their larger construction endeavors through domestic savings or financial resources from abroad. The funding for construction projects in the in-

formal or smaller construction market sector usually comes directly from domestic savings. Larger projects in the formal sector usually are funded through loans and grants from international agencies, individual developed country governments, and investment from private firms based in other countries (Zuvekas 1979). The most important sources of multilateral finance for construction projects are the World Bank [through the International Bank for Reconstruction and Development (IBRD)] and the International Monetary Fund (IMF). These institutions lend funds at interest rates several points below those charged by private lenders and sometimes lend for very long periods of time at zero interest rates (Henriod et al. 1984; Zuvekas 1979). Other international lending agencies include the United Nations and its associated affiliates, such as the World Health Organization (WHO) and the International Labor Organization (ILO). These agencies normally fund the construction and operation of health centers and those construction projects employing labor-based methods. A more modest source of funding is provided by regional banks (Inter-American Development Bank), the European Economic Community (EEC), and by the Organization of Petroleum Exporting Countries (OPEC) (Henriod et al. 1984). Private foreign investment is provided mainly by large multinational companies having an economic interest in the country, especially for those projects involving large volumes of raw materials like copper, bauxite, coal, and iron ore (Todaro 1985).

This section has described the many risks and challenges associated with working in a developing as opposed to a developed country. These challenges may well be worthwhile to consider given the abundant project opportunities that exist in these parts of the world. However, prior to embarking on such a venture, AEC firms need to gather as much information as possible regarding characteristics of the countries in which they are interested in working. The next section describes key information requirements identified by AEC companys that have had experience building projects in developing countries.

KEY INFORMATIONAL REQUIREMENTS

A study was conducted by the first writer to determine informational requirements of AEC firms interested in bidding work on international construction projects (Jaselskis 1994). The information gathered highlighted several areas that had the potential to be very important in a firm's decision on working abroad. Informational requirements were identified from literature searches and interviews with industry professionals. A total of 60 interviews were conducted with professionals in construction, design, and consulting firms; professional organizations (e.g., Associated General Contractors of America); governmental agencies [e.g., the U.S. Agency for International Development, Overseas Private Investment Corporation (OPIC), the U.S. Department of Commerce, and the State Department]; and international banks (e.g., the Export-Import Bank and the World Bank) to help identify critical information needs for firms interested in working abroad. A list of the top 15 information requirements are described in the following in order of importance:

1. Type of laws and regulatory requirements. Legal requirements (e.g., permit requirements, taxes, safety rules, and environmental regulations) are considered very important because they include the types of rules and regulations that U.S. AEC companies need to abide by in a particular country. A company may risk being fined or a construction project may be shut down if a firm is not familiar with the rules and regulations in the host country.
2. Type of import restrictions on materials, equipment, and labor. Knowledge of import restrictions on materials, equipment, and labor have a high rating among U.S. firms. Understanding import restrictions are important because factors such as preshipment inspections, warehousing arrangements, and different types of licenses that must be obtained need to be fully understood to develop a realistic project execution plan.
3. Construction risks. This factor is rated highly because knowing the risks (e.g., adverse weather conditions, potential labor and material shortages, and numerous holidays) may determine whether a company will be successful or unsuccessful in the country of interest.
4. Availability and cost of construction materials. It is important to understand the availability and cost of construction materials in another country because the construction firm will most likely need to purchase many of the materials locally. Typical materials include cement, bricks, sand, steel, lumber, fuel, asphalt, stones, and possibly electrical and mechanical equipment.
5. Characteristics of subcontractors. The characteristics of subcontractors in a foreign country is a critical factor to U.S. AEC firms because most foreign countries require that a percentage of the construction work will be subcontracted to residents of the host country. This will require the international firm to plan, schedule, and construct the project based on indigenous subcontractors, which could impact several aspects of the work (e.g., quality, productivity, and training requirements).
6. Availability of construction material facilities. Because many countries have strict importation requirements, it is important to understand the production capabilities found in the country in which a project is being considered. This factor provides information on production facilities such as ready-mix concrete plants, brick manufacturing companies, and lumber suppliers.
7. Prequalification requirements. This is a process whereby contractors outside of the country of interest submit comprehensive capability reports, which include a firm's area of expertise, supervisory personnel experience, available equipment, and performance on past projects. Prequalification requirements for outside firms may be important to U.S. firms because this criteria will determine whether or not they are allowed to bid on a particular project.
8. Client information. This information includes the client's reputation to pay for services and how well they worked with previous contractors, designers, or consulting firms. Background information on clients is important because it is advantageous for U.S. firms to know if the client is capable of paying or has a history of financial default.
9. Stability of foreign country. This knowledge indicates whether or not the country of interest will provide a stable environment to operate in terms of its government, currency, and legislation. Knowing about the country stability is important because factors such as contracts being terminated during construction, governments nationalizing property, or fluctuating exchange rates may occur if laws frequently change and the government is unstable.
10. Quality of equipment and materials. This describes whether or not materials and equipment in a country of interest meet certain specifications, regulations, and building codes required to construct projects satisfactorily.
11. Craft worker wage rates. This factor provides a construction company with necessary information to develop accurate labor cost estimates associated with per-

forming the work in another country. It provides base wage rates and benefits for craft workers (e.g., brick masons, carpenters, and electricians) and common laborers.

12. Availability and cost of heavy construction equipment. This is important information necessary to bid and execute a construction project. It includes economic information and data on equipment such as bulldozers, end loaders, cranes, trucks, and graders. Knowing the availability and cost of heavy construction equipment is important for construction planning and cost estimating and can help the contractor determine the most effective and least expensive way to perform construction activities on a project.
13. Contacts. This factor represents a list of individuals, firms, and organizations that have relevant insights regarding the country of interest. Examples of contact information are international construction companies, material suppliers, design firms, law firms, and lending institutions. Contact information may be important because current pertinent data is received directly from a knowledgeable person in a particular country.
14. Transportation logistics. Movement of people, materials, and equipment is vital for a smoothly running construction operation. This information provides an overall description of the conditions of roads, railways, marine ports, and airport facilities including their efficiency and costs.
15. Craft worker productivity rates. This information provides the amount of time a worker can accomplish a particular task (e.g., a brick mason laying 150 bricks per hour). Productivity rates are very important because they help determine the duration and cost of construction activities (e.g., pouring concrete, laying concrete block, and installing electrical fixtures).

Thus far, this paper has discussed the unique characteristics of developing countries as well as the critical information needs of AEC firms considering work in such parts of the world. As a practical example, the next section provides some of this important information on Kenya, a typical developing country. Many of the problems encountered in Kenya are typical of other developing countries in Southeast Asia, South America, and other parts of Africa.

Specific information about the construction industry in Kenya is not readily available because there is no organization specifically devoted to gathering information and establishing an informational database for the construction industry. A few organizations that are particularly helpful include the Ministry of Works, the Ministry of Economic Planning and Development, the Investment Promotion Center (IPC), and the Joint Building Council (JBC). Specific information about the construction industry for this paper has been provided by these organizations as well as experience from the second writer who grew up in Kenya and worked in the construction industry. The next section begins with a general description of the country and its bidding opportunities for international AEC firms. A description of Kenya follows using the same criteria as that found in the 15 key informational requirements discussed earlier in this paper.

CASE STUDY INVOLVING KENYA

Country Characteristics

Kenya is situated in the middle of the east coast of Africa, has a population of approximately 28.2 million, and covers an area of 224,961 square miles (World Almanac 1997). It is endowed with a rich heritage of a variety of flora and fauna, the foundation of its tourism industry. Kenya's population is multiracial, comprising Africans, Europeans, Americans, Asians, and Arabs among others. The major population centers include the capital city Nairobi (with a population of approximately 2.5 million), Mombasa, Kisumu, Eldoret and Nakuru. The urban population accounts for 20% of Kenya's population, whereas 80% is rural (Central Bureau of Statistics "Statistical" 1996). English is the official language while Kiswahili is the national language.

The climate conditions in some parts of Kenya can sometimes be very extreme including rain, cold, and hot and humid conditions. The cold season occurs between May and September with the temperature between 10 and 23°C and a humidity of 60%. However, this is experienced only in the Kenya highlands and the Great Rift Valley, which includes areas such as Nairobi, Nakuru, and Eldoret. In the same region, the hot climate occurs between October and April, with temperatures between 12 and 28°C and a humidity of 50%. In Mombasa at the coast and Kisumu on the shores of Lake Victoria, temperatures fluctuate between 16 and 28°C with humidity of 70% between May and September and 18 and 31°C with humidity of 60% from October to April. In the dry areas, which include parts of northern Kenya, temperatures vary between 20 and 34°C throughout the year (Central Bureau of Statistics "Statistical" 1996).

Rain interrupts construction work frequently in areas prone to high levels of rain. The long rainy season starts in April and ends in August. The short rainy season occurs between October and November. The high rainfall areas, which include the coast, highlands, and the lake region, experience up to 2 m of annual rainfall. Marginal areas (areas surrounding the high rainfall region) receive up to 1 meter annually. The dry areas, especially the north and northeastern regions (e.g., Lodwar and Mandera), scarcely receive more than 300 mm annually (Central Bureau of Statistics "Statistical" 1996). Depending on where the project may be located, these climatic attributes may have far-reaching effects on the progress of work as well as impair the productivity of workers.

Bidding Opportunities

With the revival of the East African Corporation (including Kenya, Uganda, and Tanzania), investment opportunities within the region are becoming even more attractive; this region has an estimated population of over 100,000,000 people. Foreign investors may have the opportunity to expand to the other east African countries such as Uganda, Tanzania, Ethiopia, and Sudan using Kenya as their base. Kenya also is a member of the Preferential Trade Area (PTA) agreement, embracing countries in eastern and southern Africa. Recently, this has been transformed to be the Common Market for Eastern and Southern Africa (COMESA) with a population of over 300,000,000 and includes countries such as Zimbabwe, Zambia, and South Africa. Exports and imports within the member counties enjoy preferential tariff rates. There are vast opportunities for development projects in this region.

Major projects that could interest foreign firms may be located in remote areas of the country, which may require very high mobilization expenses. Some of the major projects planned in Kenya for the current five-year development period (1997–2001) include such projects as roads, sewerage treatment, water supply, bridges, offices, educational facilities, hospitals, housing, power generation, irrigation, and pipelines. Five power stations currently have been planned to add 388 MW to the national electricity grid (Republic of Kenya "National" 1997). As an indication of the need in the power sector, the total electricity supply in the country is only 822 MW including imports from Uganda from the Owen Falls power plant on the River Nile, while the demand is 1,200 MW. The

electricity supply is therefore inadequate with demand always exceeding supply particularly during the peak periods. The supply of electricity is particularly low during the dry season when the dam reservoirs are low. Sometimes generating plants break down or are out of service for maintenance. On such occasions power must be rationed reducing productivity in most sectors.

Many opportunities exist for build operate and transfer (BOT) projects. Every region of Kenya has construction needs, but the inhibiting factor is finance. There are so many needs to build new bridges, roads, subways, housing, water treatment facilities, power generation, and hospitals. Foreign firms interested in bidding on one of these projects will need to perform very detailed feasibility and risk analysis studies before committing to the project. The government, in the face of economic liberalization, has recognized the importance of BOT projects in its current development plan (1997–2001) and has undertaken to put in place structures and mechanisms for its efficient operation.

Key Information for Bidding Projects in Kenya

Each of the key informational items identified earlier in this paper are filled in with information specifically related to Kenya.

Type of Laws and Regulatory Requirements

Kenyan laws resemble the law applied in the commonwealth countries, except for customary laws, which are based on local traditions. The Kenyan law was derived from the British law, basically the criminal and civil laws. Some laws from other commonwealth countries are applicable in matters of criminal and civil cases (e.g., Indian and Australian laws). Customary laws are only applicable in disputes of marriage, divorce, and property succession. Customary laws may not affect a foreign firm in construction business but may affect foreign workers if they get involved in aspects such as marriage with with the local people. However, there are certain cultural beliefs that may affect construction and these may vary from place to place. For example, if the site is located in what may be considered a sacred land by the local community, it may be difficult to get the local labor to work on that site. This is common practice in the United States, as Indians have the same rules that must be followed.

The construction industry in Kenya is modeled along the structure of the colonial British construction industry, which has not changed over time. The procedures and rules in operation resemble the traditional project procurement systems where the risks associated with this system are heavily slanted against clients and contractors. In this system the architect or engineer normally assumes the leadership of the design and construction and, hence, becomes a player and referee in the construction process. The present schedule of agreement and conditions of building contracts, for example, borrowed heavily from the British Joint Construction Tribunal (JCT) formed in 1963. It has not been reviewed since its first draft in 1967. At the time of drafting, clients and contractors were not represented and their interests were not well articulated. For instance, in the Ministry of Works contract, the contractor is not allowed to terminate the contract under any circumstance and he is not allowed interest on delayed payment. Another shortcoming inherent in the contract is that clients have no redress for mistakes committed by consultants and most AE firms are not compelled to have professional indemnity insurance coverage. Somehow they always have someone else to blame for their mistakes. For instance, in the history of construction in Kenya, there is no reported case of an AE firm charged with negligence and yet grounds for such cases are widespread!

The government of Kenya allows foreigners to have key expatriate staff in senior management positions or other key personnel where local skills are not available. Work permits for such expatriates are issued by the government. Operating licenses and work permits may not be difficult to obtain if an AEC firm can prove that its activities will provide some type of benefit to the country such as technology transfer or training of local personnel. There are a large number of legal firms, some of which are foreign owned, with vast experience at the local and international level. Businesses are regulated by the laws of Kenya (e.g., Act Chapter 486 and Arbitration Act Chapter 49). Many of these laws have been reviewed and brought into line with international standards. Thus, legal representation and dispensation may not be a problem for foreign firms wishing to do business in Kenya.

Type of Import Restrictions on Materials, Equipment, and Labor

Importation rules have been relaxed with the implementation of structural adjustment programs (SAPS), a prescription of the World Bank for structural reforms. Therefore, all sorts of goods can be imported so long as the necessary inspections and duties are paid. For government projects and projects sponsored by nongovernmental organizations (NGOs), there are rules that allow importation of goods and equipment duty free. Companies may enjoy some tax holidays under the new investment promotion policies. There also are many attractive packages aimed at attracting foreign investment: (1) allocation of free land in the export processing zones (EPZs), (2) repatriation of capital and profits, (3) 10-year tax holidays for enterprises operating in the EPZs, (4) exemption of import duty on machinery and raw materials, and (5) no restriction on foreign management and technical staff. Materials produced on site are not subject to taxation (Wells 1993). This could reduce markedly the cost of materials and enhance the company's competitiveness, at the same time enabling the contractor to maintain higher quality standards.

Construction Risks

Construction firms working in Kenya are exposed to a wide range of economic, contractual, and climatic risks. Economic risks are manifested by unstable material prices, which are influenced greatly by the level of inflation and commercial bank interest rates. For example, inflation shot up from 27% in 1992 to 46% in 1993 and dropped again to 28.8% in 1994 (Central Bureau of Statistics "Economic" 1996). Commercial bank lending rates currently fluctuate between 30 and 35% per annum. However, a drop in inflation or interest rates does not necessarily result in a fall in material prices. Contractual risks are compounded by use of archaic documents, rules, and procedures. For instance the schedule of agreement, contract conditions, procedures for selecting contractors, evaluation of bids, and planning and supervision of construction work have not been modified since their inception in the 1960s. However, there have been some changes in the construction industry since this time related to size, complexity, and the technology used for construction work; but there have not been commensurate changes in the processes and rules to cope with the new challenges.

Availability and Cost of Construction Materials

Material supply and distribution is one of the major problems facing the construction industry in Kenya. The materials vulnerable to shortages are cement, steel, and lumber (Talukhaba 1997). It is important to note that cement and steel require a high percentage of import components. This means

that the prices of cement and steel are vulnerable to the fluctuation of the Kenya shilling (Ksh.) against international currencies, which is highly unstable because the economy relies on primarily agricultural goods for exports such as tea, coffee, flowers, fruits and vegetables, and amorphous industries such as tourism. As a result, prices of construction materials can increase drastically within a very short time. For instance the price of cement in 1992 was only Ksh. 3,930 (U.S. $72) per ton, this increased to Ksh. 5,630 (U.S. $102) in 1993 and to Ksh. 7,510 (U.S. $137) in 1994 and again to Ksh. 8,120 (U.S. $148) in 1995, an increase of approximately 100% in a period of only three years (The Joint Building Council 1996). This can have far reaching effects on the cost of projects considering the long time period for most construction projects.

The other aspect related to materials is artificial shortages caused by economic saboteurs to influence prices. Because the supply of materials is controlled by a few firms, sometimes they can collude and hoard materials to cause an artificial shortage to force prices upward. Occasionally, if a better price is offered in a neighboring country, traders may smuggle materials across the borders causing a shortage.

Steel supply is also a problem caused by difficulties with customs and importation requirements. The shortage of lumber is caused by the increasing government control on the exploitation of timber resources for environmental reasons and also poor transport because of poorly maintained roads and equipment. Other materials such as sand and ballast are available, but they too may be in short supply, because of similar transport problems.

Characteristics of Subcontractors

In Kenya a wide variety of subcontractors exist (e.g., for excavation, electrical, mechanical, concreting, roofing, etc.). International firms desiring their services may need to provide training in quality control if they wish to maintain certain international standards. Kenyan subcontractors also may require a higher degree of supervision to produce quality work and to meet set milestones. A company lacking experience in Kenya will most likely experiment with different styles of subcontractor management before settling on the best approach. Table 1 shows a current list of registered contractors as maintained by the Ministry of Works. Category A contractors are the most experienced by Kenyan standards. These contractors can undertake both building and civil engineering contracts. They would be required to maintain heavy equipment, qualified personnel, good banking records, and reputable insurers. Out of the 153 contractors in category A, only 10 are foreign owned. Category H contractors only require letters of reference and recommendation and may be in possession of a small number of tools. A large number of firms in categories E, F, G, and H, exist only in name.

Availability of Construction Material Facilities

There are two plants producing cement in the country that generally do not satisfy the demand for the entire country because they primarily produce cement for the East African region. Facilities exist within Kenya to produce certain types of paint, glass, and roofing tiles; they are typically small local operations located within towns and villages throughout the country. Quarry operations exist to produce sand and ballast but produce at rates below demand.

Prequalification Requirements

The client of a project with full local funding most likely will resort to familiar local procedures for selecting a contractor and the use of local standard specifications and contract forms. The common method of contractor selection is through advertising in the local press. The criteria for construction firm selection is experience, qualified personnel, stable financial backing, and good past experience. Preselected contractors bid in competition, and the lowest bidder is most often awarded the contract. Most contracts are lump-sum contracts with the bill of quantities forming part of the contract documents. Negotiation is preferred in the private sector and sensitive government projects (e.g., ministry of defense projects). The use of selected bidders followed by negotiation occasionally is used for large complex projects, for both government and private sector projects. However, projects financed by foreign and international organizations, for example, the World Bank and the European Community (EC), may insist on international contracting strategies, and the use of standard international contract agreements [e.g., International Federation of Consulting Engineers (FIDIC) documents].

TABLE 1. Contractor Characteristics in Kenya

Category (1)	Number of contractors (2)	Value of work performed (3)	Nature of work performed (4)
A	153	Unlimited	Building and civil projects
B	184	Up to Ksh. 100,000,000 (U.S. $2.0 million)	Building and civil projects
C	251	Up to Ksh. 75,000,000 (U.S. $1.5 million)	Building and civil projects
D	480	Up to Ksh. 50,000,000 (U.S. $1.0 million)	Building works
E	520	Up to Ksh. 25,000,000 (U.S. $0.5 million)	Subcontract works for building, electrical, mechancial, civil, and maintenance
F	821	Up to Ksh. 10,000,000 (U.S. $0.2 million)	Subcontract works for building, electrical, mechanical, civil, and maintenance
G	1,210	Up to Ksh. 5,000,000 (U.S. $0.1 million)	Subcontract works for building, electrical, mechanical, civil, and maintenance
H	1,732	Up to Ksh. 2,000,000 (U.S. $0.04 million)	Maintenance works

Client Information

The main construction industry client is the government, controlling approximately 60% of construction in Kenya (Central Bureau of Statistics "Statistical" 1996). The rest is shared between international multinationals and local cooperative societies. Most government projects are financed through foreign loans, grants, or aid. A majority of others are financed through treasury allocations or joint ventures between a foreign agency and the government. The government has been known to default in payment to contractors and consultants for lack of funds and poor financial planning and control. Sometimes the government initiates projects without serious planning especially related to financing. Eventually, contractors and consultants get paid, but when the funds become available. Dealing with the government requires a great deal of patience in waiting and sometimes lobbying. An AEC firm wishing to engage in privately funded projects may have to demand some information regarding the financial strength and reputation of the client and perhaps insist on written guarantees on the availability of funds.

Stability of Foreign Country

The political environment in Kenya can be described as fairly stable (by African standards) considering the political

turbulence experienced in neighboring countries in the region, such as Somalia, Rwanda, and Sudan. However, it is not without its own peculiar problems. Since attaining independence from Britain in 1963, the country was under one political party dictatorship, until 1992, when it succumbed to both local and international pressure to allow multiparty democracy. For the last five years, many opposition parties have been formed but their operation has been hampered by the national constitution that essentially supports one-party dictatorship. Although much has been achieved since the introduction of multipartisan groups, a lot more is yet to be realized in terms of freedom of the press and the right to associate.

Overall, the country is peaceful, although, occasionally, with the increasing economic hardships in the urban centers, one may expect some disturbances; for example, street running battles between thieves or hawkers and police could be expected in Nairobi and Mombasa. In rural areas, cattle rustling is a common occurrence.

Kenya has followed a mixed economic development strategy since independence. In recent years, there has been a shift of emphasis from public investment to private investment on realizing that most public enterprises are collapsing because of corruption and mismanagement. The government is divesting most of its public enterprises. Kenya's economy depends largely on agriculture, which accounts for a third of its gross domestic product (GDP) and approximately two thirds of exports. Agriculture is supplemented by manufacturing, commerce, and tourism, which collectively account for approximately 25% of the GDP (IPC 1996). Traditionally, the biggest foreign exchange earners have been tea and coffee, but tourism and horticulture have become increasingly important. Consignments of fresh fruits, vegetables, and flowers are air freighted daily to various destinations around the world.

Quality of Equipment and Materials

The quality of some materials could be lower than international standards. Materials such as cement, steel, plumbing and sanitary fixtures, and electrical products are all locally available. Steel, sanitary, and electrical products mostly are imported and could measure up to international standards depending on the country of origin. However, locally produced materials such as cement, paints, glass, and roofing tiles are made to local standards. Some of the materials could be obtained from the Jua Kali industries. Jua Kali is a kiswahili word that means "hot sun." It is a term used to refer to local industries that utilize local materials and technology. Most of them are open air, in the hot sun. The products of Jua Kali industries do not meet any known standards but serve as an important role in import substitution. The Kenya Bureau of Standards (KBS) has developed very few standards for materials in the construction industry, among them timber, steel, and cement. A host of other materials, especially those locally available (e.g., sand, ballast, and local sanitary and electrical goods) have no local standards and still refer to older British or American standards. For instance, most specifications for concrete still refer to the following British Standard Codes of Practice: BS CP110 (the structural use of concrete), 1972; BS 1926 (ready-mixed concrete), 1962; and BS 3148 (tests for water for making concrete), 1959. Quality-related problems are worse for materials emanating from the Jua Kali sector. Poor supervision from the construction staff, some of whom may compromise on standards by receiving bribes, is a common problem. To compound its problems, the KBS has serious problems enforcing its standards; it has neither the capacity nor the technology to authenticate the quality of materials from a large number of manufacturers and producers, who maintain that they follow British standards. Quality problems primarily are caused by consumer ignorance, largely as a result of lack of awareness about quality issues, and made worse by a high level of illiteracy.

Craft Worker Wage Rates

Craft worker wage rates generally are low compared with international standards. A skilled union worker earns Ksh. 25 (U.S. $0.45) per hour whereas unskilled workers earn Ksh. 10 (U.S. $0.18) per hour. There are no differences in wage rates for different trades. However, high-risk work (e.g., working in dangerous areas on tall building structures), attracts a higher pay that is often negotiated. Overtime is paid at one and a half times the normal hourly rate and double the hourly rate on Sundays and public holidays. These wage rates are negotiated between trade unions and the Federation of Kenya Employers (FKE). The wage rates are even lower for nonunion staff, who negotiate their rates directly with the employer and probably may not be as experienced as the union worker. A distinction is made between casual or part-time workers and employees with permanent employment. Casual workers are provided no benefits except the pay (this is common practice worldwide). It is a common practice by most construction firms to hire workers on casual terms and fire them as soon as the contract is over whenever it suits the firm. Permanent employees receive a house allowance, contribution to medical insurance, and one paid holiday per year.

Availability of unskilled labor may not be a problem considering the high rate of unemployment. Unemployment as of 1994 was assessed at 18.5% (Republic of Kenya "National" 1997). However, considering the large number of underemployed laborers, the figure is higher in real terms. Official government figures on issues such as inflation, unemployment, illiteracy, crime, etc. are always viewed with suspicion because the government tries to reflect statistics that make the situation look better than reality. For instance, in unofficial circles, it is widely believed that unemployment is approximately 40% and not 18.8% as the government maintains.

Availability and Cost of Heavy Construction Equipment

Availability of heavy equipment may be a significant problem in Kenya depending on the type of equipment required. There are very few firms specializing in the provision of construction equipment. The available equipment may be old and in a poor state of repair. The types of equipment that could be found in Kenya are trucks, pickups, bulldozers, graders, concrete mixers, and hoists. It is likely that most heavy equipment required for a project such as rollers, compactors, ditch winches, tractors, and graders will need to be imported to Kenya because this equipment may not be available in sufficient quantities. Construction firms would have to make a detailed analysis to compare the merits of using what is available versus importation, especially when all the importation costs (e.g., transport and duties) are taken into account. Import costs include customs duties and value-added tax (VAT). Customs duty on plant and machinery is 5% of the FOB value whereas VAT is 6%. However, exemption of duties can be allowed on machinery that is imported for use in development projects (e.g., roads, water, dams, and hospitals). Lighter equipment such as mixers, vibrators, dump trucks, water pumps, hoists, and light cranes could be purchased locally but the cost may be high due to taxation. Equipment available for hire could be poorly maintained and prone to frequent breakdowns.

Contacts

Some of the more important organizations that may be contacted to provide more information about Kenya are as follows: Ministry of Works, the Ministry of Economic Planning

and Development, the IPC, and the JBC. Also, through the university system, some basic data collection efforts can be accomplished to provide interested companies with more information about Kenya. These contacts can be used to identify material suppliers, design firms, law firms, and lending institutions located within Kenya.

Transportation Logistics

Kenya's transport system comprises five major modes, namely, road, railway, maritime, pipeline, and air. The road transport in Kenya currently accounts for over 80% of the country's total passenger and freight traffic. Of the approximately 63,700 km of classified roads in the country, only 8,800 km or 14% are paved (Republic of Kenya "National" 1997). There is another 80,000 km of unclassified roads. The unpaved and unclassified roads usually are impassable during periods of heavy rain. Although Kenya has one of the most impressive road networks in East Africa, the deteriorating condition of this network because of inadequate maintenance is one of the serious constraints to overall country development. This has led to high vehicle-operating costs, unstable delivery schedules, and low investment in the transport sector leading to high production costs, noncompetitive exports, and high costs of importation of inputs and capital goods (Republic of Kenya "National" 1997). The cause of Kenya's poor roads relates to inadequate funding from the government for both periodic maintenance and routine maintenance.

All imports arrive at the port of Mombasa, which has adequate facilities and is comparable in quality and size to other international ports. Mombasa is a deepwater port with 21 berths, 2 bulk oil jetties, and 2 dry bulk wharves and can handle all types of ships and all types of cargo. It handles import and export goods not only for Kenya but also for other landlocked countries in the region, for example, for Uganda, Sudan, and eastern Zaire. Freight haulage through the port of Mombasa (both imports and exports) averages 10,000,000 tons annually (IPC 1996). Efficiency in which goods are cleared from customs may appear slow at times. Goods may take on average approximately two weeks to be cleared. Poor road conditions may delay the movement of goods inland and reduce the number of timely material deliveries. The roads are full of pot holes of all sizes and generally are in poor state of repair both in the urban and in the rural areas. The famous Kenyan saying that "it is only drunks who drive straight on roads in Kenya" confirms the poor state of repair for many of the roads in Kenya. Private haulers and the government-owned Kenya railways may be inefficient. Private haulers are hampered by poor road conditions and an old and poorly maintained fleet of transport vehicles. Rail transport is provided by the Kenya Railways Corporation, whose management under government regulations has contributed to its inefficiency as is the case with most government run companies that are plagued with widespread corruption. This means that more-than-normal time lags would have to be allowed for deliveries of imported equipment and materials.

Craft Worker Productivity Rates

Productivity rates are generally lower for both skilled and unskilled laborers compared with workers in developed countries because of lack of sufficient training and the use of manual as opposed to equipment intensive construction techniques. However, productivity rates may be enhanced by a company's incentive program. Some of the available skilled laborers may need on-the-job training to learn skills expected in order to meet international standards. Also, as can be expected, the current demand for such skilled labor is high relative to the supply.

To increase productivity, training programs for construction workers are available in technical colleges and through apprenticeships. It is a government policy with regard to construction contracts that on any contract that exceeds Ksh. 10,000,000 (U.S. $180,000), the contractor should pay 7.5% of the contract value to the Training Levy Trustee Fund. Contractors usually transfer this expense to the client. As an incentive, contractors and consultants who hire apprentices are compensated by claiming refunds from the training levy fund. The refund is based on the total cost spent on the hired apprentices including salary and training costs. Proof of the amount expended is essential for reimbursement.

CONCLUSION

Opportunities abound for U.S. AEC firms to bid on many types of projects in developing countries. This paper has discussed unique differences between developed and developing countries related to government and political instability, lower standards of living, lover levels of productivity, higher levels of unemployment and underemployment dependence on agricultural production and primary product export, and their vulnerability in international relations. Additionally, the top informational requirements were identified by construction industry experts prior to bidding on a construction project in another country. They related to the type of laws and regulatory requirements, types of import restrictions, construction risks, availability and cost of construction materials, subcontractor characteristics, availability of construction material facilities, prequalifications requirements, client information, stability of foreign country, quality of materials and equipment, wages rates, availability and cost of construction equipment, contacts, transportation logistics, and craft worker productivity. As a practical example, some of this important information was provided on Kenya, a typical developing country.

ACKNOWLEDGMENTS

The writers appreciate the information provided by individuals regarding possible information requirements for AEC firms. We acknowledge Willi Meyers and Lori Dooley at the Center for Agriculture and Rural Development (CARD) at Iowa State University for Funding this research study and providing useful advice throughout the duration of the project.

APPENDIX. REFERENCES

"A greener hue for development aid." (1987). *The Economist*, Vol. 302, March 28, 69.

Coukis, B. P., and Grimes, O. F., Jr. (1980). "Labor-based civil construction." *Finance and Devel.*, 17(1), 32–35.

Economic survey 1995, Republic of Kenya. (1996). Central Bureau of Statistics, Nairobi, Kenya.

Elinwa, A. U., and Buba, S. A. (1993). "Construction cost factors in Nigeria." *J. Constr. Engrg. and Mgmt.*, ASCE, 119(4), 698–713.

Henriod, E. E., et al. (1984). *The construction industry: issues and strategies in developing countries.* World Bank, Washington, D.C.

Investment Promotion Center (IPC). (1996). *Kenya: a guide for investors, Nairobi.*

Jaselskis, E. J. (1994). "Informational requirements for developing an international agribusiness database." *Final Rep.*, Center for Agriculture and Rural Development (CARD), Iowa State University.

Joint Building Council (JBC). (1996). "Fluctuation clause price list, Nairobi zone." Architectural Association of Kenya, Nairobi, Kenya.

Koehn, Enno, Kothari, R. K., and Pan, C.-S. (1995). "Safety in developing countries: professional and bureaucratic problems." *J. Constr. Engrg. and Mgmt.*, 121(3), 261–265.

Merriam, A. H. (1988). "What does Third World mean?" *The Third World states of mind and being*, J. Norwine and A. Gonzalez, eds., Unwin Hyman, Boston, Mass., 15–22.

Nafziger, W. E. (1984). *The economics of developing countries.* Wadsworth Publishing Company, Belmont, Calif.

"National Development Plan (1997–2001)." Republic of Kenya (1997). Printing by the Kenyan Government, Nairobi, Kenya.

Ruvkun, S. (1981). "Construction experience in Latin America." *J. Constr. Engrg. and Mgmt.*, 107(2), 313–322.

Simpson, E. S. (1987). *The developing world: an introduction.* Longman Scientific and Technical; Essex, England. John Wiley & Sons, Inc., New York.
Spence, R. J., and Cook, D. J. (1983). *Building materials in developing countries.* John Wiley & Sons, Inc., New York, N.Y.
Staab, G. E. (1989). "Construction of port and facilities on horn of Africa—lessons learned." *J. Constr. Engrg. and Mgmt.*, 115(1), 53–69.
"Statistical abstract 1995, Republic of Kenya." (1996). Central Bureau of Statistics, Nairobi, Kenya.
Talukhaba, A. A. (1997). "An investigation into factors causing construction project delays, a case study of high-rise projects in Nairobi," PhD thesis, University of Nairobi, Kenya. (preliminary draft).
Todaro, M. P. (1985). *Economic development in the Third World.* Longman, Inc., New York, N.Y.
Wells, J. (1986). *The construction industry in developing countries: alternative strategies for development.* Croom Helm and Billing & Sons, Ltd., London, England.
Wells, J. (1993). "Appropriate building technologies: an appraisal based on case studies on building projects in Senegal and Kenya." *Constr. Mgmt. and Economics*, II, 203–216.
Wolf, L. G. (1988). "The poorest of all of us." *The Third World states of mind and being*, J. Norwine and A. Gonzalez, eds., Unwin Hyman, Boston, Mass., 99–111.
World almanac and book of facts. (1997). World Almanac Books, K3 Reference Corporation.
World Bank. (1981). *The road maintenance problem and international assistance.* World Bank, Washington, D.C.
Zuvekas, C. Jr. (1979). *Economic development: an introduction.* St. Martin's Press, New York, N.Y.