

Engineering Internationally

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Observations on the challenges, frustrations, and rewards of international projects.

International projects can provide civil engineers with opportunities to practice their profession in unusual and exciting ways. They can present enormous challenges that an engineer may not have faced previously in their career if their experience has been limited to working in North America. This article discusses some of the unique features of international projects and provides a brief introduction to the uninitiated.

First, a point of clarification: Since all of my international experiences have been with public projects in developing countries located in Africa, South America, Eastern Europe, and the Caribbean, my perspective is strongly slanted in that direction. Consequently, many of my observations will not be applicable to international projects in the developed world or to private-sector projects.

In my experience, the major challenges of international projects for an engineer can be broadly categorized as financing, cultural issues, and lack of infrastructure.

Financing

A necessary (and quite difficult) phase of each of the international projects in which I have been involved is financing. Developing countries, almost by definition, have certain financial constraints that affect a project's development. In many cases, an engineer will play a large role in this development and interface with the financing agencies involved. These agencies can range from bilateral (the Export Import Bank of the United States and other export credit agencies) to multilateral (the World Bank, the African Development Bank, and others). Often, an engineer may serve as the primary liaison between the financing agency and the client. This process can be incredibly time consuming as well as frustrating. Patience and persistence are absolute necessities to achieve success. Although this phase may require little in the way of engineering expertise, it may be the most important "value-added" service that an engineer provides during the project.

Concessionary financing, which is defined as having below-market-rate terms, usually requires more steps to acquire than non-concessionary financing. Agencies providing this type of financing have certain mandated criteria that a project or the project sponsor must meet. Addressing these criteria involves substantial time and documentation.

In my experience, local engineers are usually quite capable of providing the technical expertise required for a project. Where they need the most assistance is in negotiating through the maze of international financing requirements.

Cultural issues

Most engineers are aware that cultural issues can affect how a project is produced. What may be surprising is how significant those effects can be. For example, local customs regarding holidays and work hours can dramatically affect productivity. Public holidays are difficult to track, and new ones can appear at the government's whim. Engineers not accustomed to the local calendar can be in for a shock when holidays and actual productive work hours are factored into a project schedule. In countries that are primarily Christian, the Christmas season

can start early and finish late, wreaking havoc on a well-organized Gantt chart. Muslim workers may observe daily prayers during the workday, and fasting during the Ramadan observance is also likely to affect productivity.

One cliché that appears to have an element of truth is that some cultures place little value on time. I have seen the supporting evidence: Scheduled meetings and appointments are sometimes treated quite casually in developing countries, creating significant frustration. Worrying about deadlines is not a natural pastime in these cultures, and trying to impose western-style project management can be a major task.

On more than one occasion, a client expressed to me admiration for the American work ethic as epitomized by our project work team. When this happened, I was surprised because I did not think we were working that hard! However, in contrast to local norms, our work habits were exceptional since we worked after hours and on weekends.

Engineers working internationally should research the local culture and use the information gained during this process in their project planning as much as possible. The best source for this knowledge is a fellow engineer who has relevant (and hopefully recent) experience in the same locale. Another source of information for U.S.-based engineers is the Commercial Service office at the U.S. Embassy. Each Commercial Service office publishes reports on local business practices and culture.

It is important to understand that in the final analysis, the best that can be achieved is management of a local culture's effect on a project and mitigation of some of the detrimental impacts. Trying to impose one's own culture and values on a project is a frustrating and ultimately fruitless exercise.

Lack of infrastructure

Lack of infrastructure is a significant factor that engineers face when transitioning from working in the developed world to a developing country project. Items that are normally taken for granted suddenly become huge obstacles. These infrastructure problems can include constant loss of electrical power, lack of potable water, deteriorated road conditions, difficulties in communications, inadequate sanitation, and much more. The water and sanitation problems also create serious health issues, such as malaria, typhoid, and cholera, which affect a project's workforce.

Initial project planning must address these issues and attempt to mitigate their impact on the project as much as possible. For example, include backup generators in temporary project offices, as well as in the project facilities being designed. Designs for project water and sanitation services usually involve much more than just a connection to the local utility. Certain projects will require their own stand-alone treatment facilities for potable water and wastewater service, both of which will need to be supplied with backup power connections. Transportation routes to a project may require upgrades beyond the project boundaries to support increased traffic or just to provide an acceptable standard for construction access. Of course the local authorities will want to have a say in how these improvements are implemented on their turf. Expect to spend a considerable amount of time coordinating your project with the relevant utility or ministry.

Seemingly simple tasks such as transporting people, equipment, and materials to a project site can become logistical nightmares. Ultimately, the lack of infrastructure serves as a type of overhead on the project, adding cost and time to each task.

Rewards

Undeniably, international projects have challenges and frustrations; they also have rewards. These rewards can be financial, but there are other rewards as well.

Some of the most satisfying experiences I have had as an engineer have come during international projects. On certain projects, this feeling can be explained by the combination of a great need and a grateful client; on others it is the realization that seemingly insurmountable odds have been overcome to deliver a successful project.

In the developed world, it is more and more difficult to create a huge difference in the quality of life of a project's end user. In developing countries, creating a project that improves quality of life is almost commonplace because of the incredible needs for basic infrastructure. At times, an engineer is not just improving an inadequate or outdated system; he or she is creating one from scratch.

Unfortunately, developing-country projects have sometimes become dumping grounds for poor design and obsolete or inferior materials and equipment. Consequently, providing a quality project that surpasses the client's expectations is also extremely rewarding.

Working internationally provides the opportunity to create lasting friendships with individuals from different cultures. These relationships continue to pay significant dividends long after a particular project is completed.

International work is not for every engineer, but for those who appreciate a good challenge, have a high tolerance for frustration, and can adapt to new paradigms on the fly, it can be a rewarding experience.

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