

Consultant's Perspective on the Implications of
Foreign Engineers On Transportation Engineering

By

Walter H. Kraft
Edwards and Kelcey, Inc.

I'm happy to be invited to share my views on a topic I think is very important. It is a topic we need to discuss and know more about to help us meet our future challenges.

What I would like to do is divide my remarks into five areas by asking the following five questions:

- What is a foreign engineer?
- How have consultants used foreign engineers?
- How is the foreign engineer different than the U.S. born engineer?
- What is the anticipated future supply of U.S. born engineers?
- What types of engineers are needed in the future?

To answer the first question, "What is a foreign engineer?", we can look at the following combinations:

- Foreign born person of non-U.S. parents.
- Foreign born person of U.S. parents.
- U.S. born person of foreign parents.
- U.S. born person of U.S. parents, who have lived outside the United States.
- U.S. born person that studied engineering outside the United States.
- Foreign born person that studied engineering outside the United States.
- Foreign born person who studied engineering in the United States.

Perhaps the answer to the question is any person who is not born in the United States and did not study engineering in the United States. But then I also ask myself is it really important to have such a distinction. Aren't we really looking for people with certain abilities that can apply their engineering skills at certain locations? Well, for a moment let us define a foreign engineer as a non U.S. born person that did not study engineering in the United States.

How have consultants used foreign engineers? It's not a new situation for U.S. consultants to use foreign engineers because U.S. consultants have worked outside the United States for many years. When they've gone to other countries, they've worked together with foreign consultants either on a prime or sub-consultant basis. They've also hired local engineers in these countries, which would be foreign engineers by our definition. These have been positive situations and experiences. In this country, we have an affirmative action program that we all try to meet. We hire foreign engineers as well as U.S. engineers to help us meet certain goals. That has also been a positive experience. There have also been some not too positive experiences where foreign engineers are hired to work in the back room at less than prevailing salaries.

The next question is "How is the foreign born engineer different than the U.S. born engineer?" There are six issues we can examine:

- Immigration and work status.
- Communication skills.
- Cultural and religious differences
- Work ethic.
- Engineering expertise.

Let us look at the first issue - immigration and work status. As consultants, we are interested in knowing if a person's status in this country is legal. We don't want to hire somebody that is here illegally. We are interested in knowing if there is a time restriction on the foreign engineer's stay in this country. We are also interested to know if an engineer is allowed to work even if he or she is in the country legally. We don't want to hire and train a person and have that person leave in a short period of time. Any time we hire an engineer, whether U.S. or foreign born, we train them. It takes from six months to a year for a new engineer to be proficient in applying the skills that have been learned.

Most foreign engineers, as well as many U.S. engineers, lack adequate communication skills. One's ability to communicate with a foreign engineer is frequently hindered by the foreign engineer's accent or lack of proficiency with the English language. Recognizing this situation some state registration boards require some foreign engineers to pass an English proficiency exam before they are granted a license.

Cultural and religious differences are experienced in such areas as holidays, working hours and foods. Common cafeterias must recognize the differences in food. Gift giving is another difference. A few years ago, at Christmas time, I was embarrassed because a foreign born engineer gave me a gift which I thought was rather expensive. I knew the person was a new engineer, and was not in a high income bracket. I wish that I had the foresight to inform the person that in our country we do not expect to give or receive gifts. Instead, I talked to him afterwards and said that the gift was appreciated, but we don't give gifts in our country. The discussion was a bit awkward for both of us.

Foreign engineers also need to acquire an understanding of what solution will work and what won't work in our culture. Some solutions work better in one culture than in another.

Foreign engineers have an excellent work ethic. They are loyal and dedicated. In fact, they remind me of the new person on the block that tries to improve, do well, and move ahead. Because they work hard, foreign engineers tend to move ahead quickly. What about a foreign engineer's experience? I think their experience is mixed. Some have experiences similar to that obtained in the United States. Others don't. In some cases, they have come from areas where solutions are more labor intensive than machine intensive. They also come from areas that use different design standards which requires adjustment. But we also have different design standards in this country between states and cities, so I don't really see different standards as a problem. Foreign engineers tend to be more analytically oriented which may be due to their degree of communications skills. Computer language is universal and may be easier to understand than another language.

Well, what about a foreign engineer's expertise? I can only say it's excellent. Engineering principles are the same worldwide. We may apply them differently but the expertise that we have learned is universal. Let's look at some of the projects at the pyramids, or Roman roads, or the Great Wall of China. These were designed and built by foreign engineers, not U.S. engineers. Also let us look at the expertise that's demonstrated by the cars and computers that are imported into this country. I think that engineering expertise is universal and should not be a point of concern.

What is the anticipated future supply of U.S. born and trained engineers? I think it's very bleak. We have a shortage now and the shortage is expected to continue in the future. I would like to relate an experience that I had when I was President of the Institute of Transportation Engineers in 1987. That office gave me the opportunity to visit many local sections and districts in North America. At every meeting I asked this question: "Is there a shortage of engineers in this area?" At all meetings except one, I was told yes. In that one meeting, I asked the wrong question, because at that meeting, there were mostly engineers in government that had restrictions on hiring. If they

could have hired, they would have hired. My informal survey told me that we have a real shortage of engineers in North America. Let us look at the future. We know that the supply of U.S. born students is declining. We also know that many engineers in government will be retiring. Furthermore, in the past ten to twenty years government did not hire as many engineers as they had previous to that time. We have a reduction in supply and an increase in demand. We need to look for alternative sources of supply.

What type of engineers are needed in the future? I don't think it is a question of whether an engineer is foreign born or U.S. born, but a question of abilities. We need engineers with good technical skills, with related experience and with good communication skills. Just as a new U.S. graduate must be shown how to utilize his/her engineering education, foreign engineers must also be shown. The total effort for the U.S. graduates and for the foreign engineers may be the same; however, areas of emphasis for each one may be different.

In conclusion, let me say I don't think it is important whether a person's engineering knowledge has been acquired in the U.S. or in a foreign country. We should continue to use foreign engineers in the United States as we have done in the past and use them for their experience and their expertise, and also to compensate them fairly for their efforts.

There are differences between foreign and U.S. born engineers that can be minimized. This is a task that we can accomplish. Our anticipated supply of new engineers will fall short of our future needs. To achieve our goals we need engineers with good technical skills, related experience and communication skills.

Foreign Engineers--Implications for Transportation Engineering:
Public Sector Perspective
by
George Gray
CALTRANS District 4

I'm going to speak about the problems that we see as a major employer of the graduates of the various universities.

Since January of 1987, CALTRANS, the California State Department of Transportation, has hired about 1,150 entry-level engineers, 690 in 1988. About half of these are foreign trained or foreign born. Such major recruitment is probably having a significant effect on the pool of potential advanced degree students in the universities. This may become a problem that the universities and we, as users, will have to face in the future. Future masters and doctoral degree students may be siphoned off and we, as a possible employer of those students, should be sensitive to that possibility and consider how we can address the problem if it develops.

For the next several years we hope, with financing vagaries and the political process willing, to hire between 300 and 400 entry-level engineers per year. To give an idea of the diversity of this infusion, in our San Francisco District that now has by far the largest proposed construction program in the state, the makeup of the 376 new entry-level engineers whom we have hired in the last two years is about 8% foreign-born Hispanic, (we have another segment of native-born Hispanic), 9% Filipino, 4% black African, 5% Indian subcontinent, 3% Vietnamese, 11% Chinese, 15% Middle Eastern, and 5% other, including three emigres from Russia and three from Japan.

This diversity provides as example of why communication skills in English is important. It is not only communication between the native-born English engineers within our organization, but also it's the Indian speaking to the Vietnamese and the Russian speaking to the Filipino. So it is especially