GEO SPEC

Vietnam – The Beautiful

Part 2: Collaboration on Geotechnical Engineering and Research

Delwyn G. Fredlund

My first trip to Hanoi, Vietnam was in May, 1993. The trip lasted only one week but it gave me an opportunity to visit several universities and appraise the infrastructure in the city of Hanoi. The initial challenge was to learn how to cross the street in a city that appeared to have no traffic lights but about 10 lanes of bicycles, motorbikes, and cyclos. Once having "mastered" this challenge, it was easier to notice the dire need to rebuild all aspects of the infrastructure.

Dr. Nguyen Truong Tien from the Ministry of Construction, Government of Vietnam, took the week out of his busy schedule to introduce me to the sites and people of Vietnam. The universities lacked many of the modern tools that are accepted as routine for solving civil engineering problems. Land surveying seemed to play a prominent role in the curriculum, while the study of environmental impact was a little-known subject. And still, international aid programs were requiring that the government have an environmental treaty in-place, for the country, in order to qualify for financial assistance. There was an awareness emerging regarding the importance of computer software for geotechnical engineering practice.

I returned from Vietnam to Canada, determined to put together a convincing proposal to the federal government of Canada, for collaboration between Canada and Vietnam. I had previously been involved in other international programs of collaboration with China and Africa and so I felt that I knew something about putting together a meaningful proposal. The highest priority for the Vietnamese people and the civil engineers of Vietnam seemed to be so obvious. Technological tools were required to allow engineers in Vietnam to solve problems in a manner similar to the way geotechnical problems were solved in Canada. The universities were desperately in need of technical books, laboratory equipment, and of course, an engineering proposal also needed to focus on a specific engineering problem of importance to Vietnam.

The most pressing geotechnical engineering problem seemed to be obvious. The city of Hanoi is built on deep, soft sediments ranging from sands to clays, comprising the Red River delta. Water for domestic needs has been pumped from the sediments underlying the city of Hanoi, for decades. Now, many of the beautiful historic buildings were showing signs of distress as a consequence of land subsidence due to groundwater pumping. It was important for engineers to understand the mechanism of subsidence, collect soils data and groundwater information related to the problem. The quality of the drinking water was also beginning to suffer from contamination. Other cities such as Bangkok had experienced similar land subsidence problems and their experience helped form the basis for the Vietnam proposal. Hanoi was a city whose infrastructure had been neglected for decades and so there was no shortage of issues that could be addressed. The greatest difficulty was trying to prioritize the problems that could be addressed.

I put together what I thought was an impressive engineering proposal for collaboration between Canada and Vietnam. I set off for Ottawa with my proposal in-hand. After discussions with officials in Ottawa, I boarded the plane back to Saskatoon, extremely discouraged because my priorities did not appear to line up with the priorities of the government officials. They had a desire to have collaboration with Vietnam but showed little or no interest in my list of priorities. I told them that I would re-think my proposal and get back to them. However, by the time I had re-

turned to Saskatoon, I felt strongly that I would do better by trying to do something personally for the universities in Vietnam. The problems of Vietnam seemed to be so enormous and I realized that I was **just one person**, but **I was one person!**

Within a matter of a few weeks I received a letter asking whether I would be the Cross-Canada geotechnical lecturer. I agreed and prepared for the grueling lecture tour. In each city where I spoke, I took a couple of minutes to say, "I have recently returned from Vietnam and I have seen a country with great needs. I have a desire to assemble the largest civil engineering library in the country of Vietnam with its 75,000,000 people and I can do it with one 20-foot container of engineering books. I ask you to send me all your used engineering books and I will see that the books get to the recently organized Vietnamese Geotechnical Institute in Hanoi." And so I proceeded on my lecture tour.

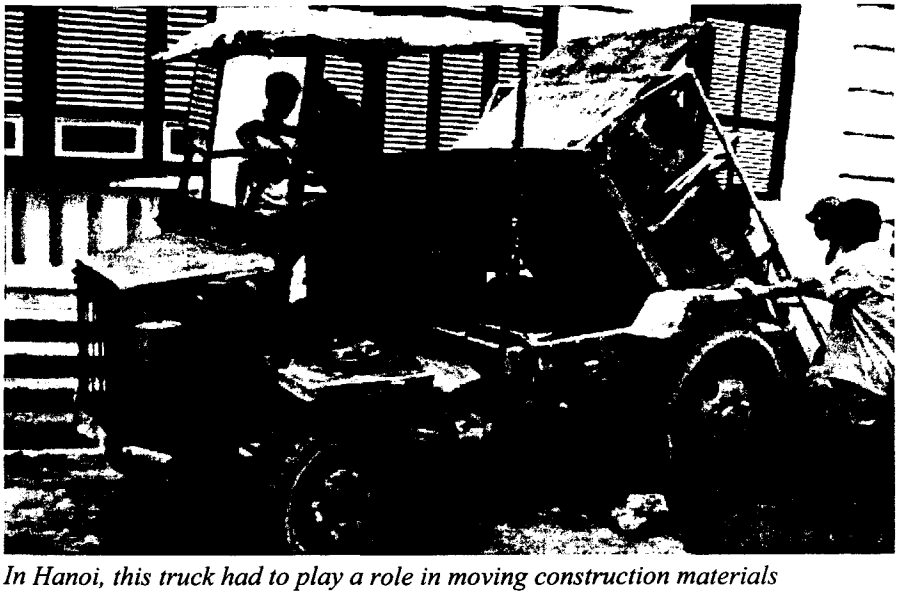
By the time I got back to Saskatoon, the used engineering books were arriving at my office by the hundreds. I organized my friends and graduate students to catalogue the books and the University of Saskatchewan provided a room for preparing the books for shipment. I also heard of a soil testing laboratory that was closing down and I put in a bid for all the equipment in the laboratory. I explained that the equipment was destined for Vietnam. My bid was $100 and it was accepted. The project was turning out to be enjoyable. But the greatest task was still ahead. How were the books going to get from Saskatoon to Hanoi, Vietnam? There were now sufficient books and equipment for the first container and still the books kept coming. The cost estimate to send the container to Hanoi was $13,000. An official from the government of Canada offered me $3000. I explained that I needed more than $13000 and my pride got in the way of accepting the money! In the end, several of my geotechnical engineering friends provided assistance and the container of books was ready to send.

The books kept coming and before the project was complete there would be sufficient books for a second 20-foot container to be sent to the Vietnamese Geotechnical Institute. Funds for sending the second container of books would be paid for by the U.S. Army; how ironical!

As the first container of books arrived in Hanoi, the government customs official examined the books and commented to Dr. Tien, "Where did you find a friend who would do this for you?" But, in reality, it was not "a" friend for it was many geotechnical friends from across Canada who had made this all possible. I would later return to Hanoi and be treated as a guest of several Ministers of the Government of Vietnam. After listening to an evening of testimonials of gratitude, I realized that all the efforts to undertake this project had been well worthwhile. I appreciated their expressions of thankfulness and realized that no matter how financially poor we might be, we always have within our grasp the greatest gift of all; the gift of gratitude. In Vietnam, I was introduced as a boy who had grown up on a farm in eastern Saskatchewan. They asked me to tell them why I had come to Vietnam and why I kept coming back. It was during my closing remarks at that banquet that I tried to explain that I felt it was important for every person to have a charitable component to his/her life. I said, "If I live my life for myself, I will feed my ego. If I live for others, I will feed my soul". Through attempting to explain ***why*** I had done ***what*** I had done, I began to better understand the importance of "sharing" at all levels in our lives.

Through the Vietnamese Embassy in Ottawa, expressions of gratitude for the engineering books and equipment were passed on to the Canadian government. In turn, I was approached and asked to consider submitting another proposal for collaboration with Vietnam. This time I collaborated with the College of Agriculture, University of Saskatchewan, and submitted a proposal that involved Land and Water Management in the Red River Basin. This proposal had a budget about three times the original budget. It was approved and this was the beginning of another venture that would lead to a better understanding of the benefits of internationalization.

During each trip to Vietnam, I would take note of some of the new construction projects with the view to learning more about geotechnical engineering practice. The projects might involve the foundations for a new office building or the repair of a stability problem along the dykes of the Red River. The required fundamentals of soil mechanics were essentially the same for both developing and developed countries. I have noted that geotechnical engineers like to pride themselves in believing that soil mechanics is a "science" that they are to apply in engineering practice. Any hon-



In Hanoi, this truck had to play a role in moving construction materials

est geotechnical engineer will readily admit; however, that there are many assumptions and approximations involved in putting the soil mechanics "science" into engineering practice. Geotechnical engineering is in reality a combination of science and many "best-guesses". This is true in a developed country but also true in a developing country such as Vietnam. The soil plays an increasingly important role in making engineering decisions.

The collection of factual data and precise measurements is costly and money, more than knowledge, is where the shortage lies in Vietnam. Consequently, the past experience of geotechnical engineers becomes an extremely valuable commodity. The "wise men" of geotechnical engineering stand out in engineering circles and it is important to obtain their expert opinions on engineering projects. Experience and intuition play important roles in geotechnical engineering. In general, it appears that those with the most extensive, advanced training in geotechnical engineering are held in the highest regard.

The Vietnamese engineers can, and rightfully should, solve the infrastructure problems of Vietnam. There may be some wrong assessments along the way but there will also be fewer lawyers trying to take advantage of the wrong decisions.

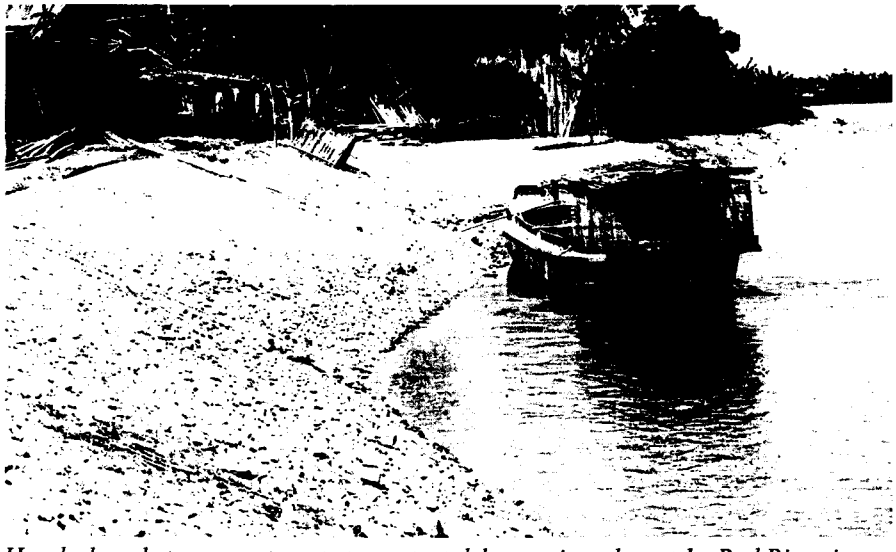
When I first came to Vietnam in 1993, an official from the Canadian Embassy informed me that I had come to the place where everything that could be used, would be used and re-used. I are important commodities that need to be used and re-used. Geotechnical engineering practice does not only depend upon having the latest equipment and computer programs; it is hard to surpass the value of past experience.

Typical of most international programs of collaboration, graduate students formed an important component of the Canada-Vietnam program. The first graduate student to Canada was Trinh Minh Thu who undertook a three-dimensional modeling of the groundwater system below the city of Hanoi. He returned to Vietnam and has become the Deputy Head of the Department of Civil Engineering at the Hanoi Water Resources University. Five other students would also become a part of the program, studying a variety of geotechnical engineering problems. Four of the students would go on to pursue their Ph.D. degrees. In addition, there were several practicing geotechnical engineers who came to the University of Saskatchewan on short term studies. As well, a delegation of 8 practicing engineers came to Canada to observe geotechnical engineering practice in Canada. At the closing banquet associated with their visit, own country. The lessons learned were taken back to impact engineering practice in Vietnam.

The latest study involves a hazard management study related to the stability of the dykes along the Red River

The problem of land subsidence in the city of Hanoi was already under study in Vietnam and the program of collaboration attempted to enhance the study. Equipment was purchased for monitoring subsidence to depths greater than 30 meters. Several different types of instrumentation were installed, resulting in the training of technical support people in Vietnam. The monitoring took place in the vicinity of pumping wells as well as near buildings such as Children's Hospital which was experiencing severe cracking problems. Undertaking the research study involved a steep learning curve, not only for those from Vietnam but also for those learning to work in a developing country.

After the project was well underway, I received word that the Land and Water Management CIDA project in Hanoi had received the Scotia-CIDA Award for the best collaborative research sponsored by CIDA . I was invited to a government sponsored banquet in Ottawa along with a representative from the President's office of the University of Saskatchewan. In Ottawa I was given a cheque for $2500 and a certificate. While the cheque was appreciated, I realized that cashing the cheque would mean that the government would get almost one half of the money back! And so I chose to keep the cheque. A couple of weeks later, I was asked to address the Heads of Department and Deans of Colleges at the University of Saskatchewan on the subject of "Internationalization". I prepared what I wanted to say and took the cheque with me. I had a



Hand-placed stone revetments to protect dyke erosion along trhe Red River in Vietnam.

plan in mind that would see Canadian graduate students travel to Vietnam and learn of internationalization, firsthand. As I entered the room I noticed cameras from two television stations. I begin to wonder if my plan was appropriate! I explained about the research work that had been done in Vietnam and then expressed appreciation for the Scotia-CIDA award. I then took out the cheque for $2500 and invited the President of the University of Saskatchewan, George Ivany, to come forward and receive the cheque with the understanding that he would match the funds and pay for air plane tickets for graduate students to go to Vietnam. I explained that internationalization needed to be a two-way street. Dr. Ivany said, "With the television cameras rolling, what can I do but give you the money". Six engineering students would later go to Vietnam for 10 days. Upon their return to Canada, they wrote of their life-changing experiences in Vietnam, in the University of Saskatchewan newspaper.

The Land and Water Project came to a close with a conference in Hanoi in October, 2001. Delegates came from Japan, Cuba, United States and Canada came to the two day conference. News items from the conference were carried on Vietnam Television and a 15-minute documentary was prepared on the past nine years that I had been repeatedly coming back to Vietnam. The Ministry of Science and Technology, MOSTE, presented an award for the contribution that had been made to science and technology development in Vietnam.

As the 5-year CIDA program on Land and Water Management drew to a close, a decision needed to be made regarding the possibility of further collaboration between Canada and Vietnam. There is no shortage of subject areas that needed to be addressed in Vietnam. Flooding had been in the news in the past couple of years, particularly as it affected the cities of Hue and Ho Chi Minh. However, Hanoi also has a dyke system that could fail, or be breached, during high flow with dire consequences. At high flow, the Red River water levels will pass through Hanoi about 4 meters above the average elevation of the city. A breach in the dykes could have serious repercussions for the 4 plus million people who live in Hanoi. Consequently, a hazard management study related to the stability of the dykes was proposed and initiated with the assistance of Clifton Associates.

Lan Anh reading the instrumentation used to monitor the subsidence in the city of Hanoi

Many times I have been asked, "Del, why do you continue to go back to Vietnam?" And I have searched my heart to find the answer. It is not easy to describe the personal satisfaction that I have received from working along side of the Vietnamese engineers and friends. I was once given a book to read that had to do with the subject of success. The author set out what he felt were the criteria that should be met by those who are recipients of gifts from another person. He stated that those who are worthy of our "excess" should be persons who; 1.) show a creative ability in the way they live (an interesting requirement, I would say!), 2.) have a good work ethic, 3.) have a need for assistance, and 4.) show a sincere desire to develop a personal friendship. During my first visit to Vietnam I felt that I found people who qualified on all 4 of the above accounts. And the same can be said for every time I have returned to Vietnam. Originally I thought that I was going to simply be involved with technology transfer to a needy country. Now I know that I have been privileged to learn many things about life and living from the Vietnamese people.

During the past nine years, I have observed that there are many simple ways in which a person can contribute to the well-being of others in society. There can truly be a charitable component, even to a person's professional life.

Delwyn G. Fredlund,
Professor Emeritus,
University of Saskatchewan,
1714 East Heights, Saskatoon,
Saskatchewan S7J 3B9
Tel: 306-374-2767
Fax: 306-966-5427
email: d.fredlund@engr.usask.ca