



ENGINEERS WITHOUT BORDERS SPEECH TO THE ONTARIO SOCIETY OF PROFESSIONAL ENGINEERS AGM – MAY 10 2003

Let me begin with a simple question: Can anyone name the father – or the founder – of engineering? The fact is, engineers are traditionally an un-remarked bunch. Not true for other professions: modern medicine can be traced back 2000 years to the analytical rigour of Hippocrates. The bedrock of today's legal system was the Magna Carta, codified more than 800 years ago. And even Adam Smith's 'dismal science' – a relative newcomer at 200 years old – has its place in the Nobel Pantheon. What happened to engineering?

I'd posit that engineering is not recognised because our profession is *evolutionary*. Cast your minds back for a moment to the emergence of human civilization. To 12,000 years ago when the modern man emerged from caves, clothed, wielding weapons, and having mastered fire. Those tools – indeed humankind's development – came at the hands of the first engineers.

Our history is really a history of technology; since the dawn of time, we have been using our ingenuity to create tools to harness the power of nature around us – to escape the vagaries of drought and disease, to gain more control over our lives. Engineers have been at the forefront of this work.

I recently finished reading the Pulitzer prize winning *Guns, Germs and Steel*. In this book, Jared Diamond takes the reader through 12,000 years of human civilization, and he attempts to explain the key factors that allowed our ancestors to develop from nomadic hunter gatherers to sedentary farmers with the capacity to support an intellectual elite. Apart from geographical and climatic factors, upon which he places great weight, he highlighted a few key human advances. Specifically, the wheel, for transport. And irrigation, for food. Essentially, the designs of the first primitive Professional Engineers!

What does this tell you about what engineering is? It's the application of practical problem solving skills to humanity's most pressing challenges. And let me ask: What is today's most pressing challenge? To me, it's fulfilling the Millennium Development Goals.

Three years ago, the people of the world, through the United Nations, agreed to a series of goals regarding the state of world poverty. To cut in half the number of people living in absolute poverty. To cut half the number of people who go hungry. To cut in half the number of people without access to safe water. These goals are both exciting and sad. They are exciting because they represent a consensus on what we need to do and will therefore focus resources where they will have the most impact.

But they are sad because of the dismal reality they represent. 3 billion people live on less than 2\$ per day. More than 1 billion don't have access to safe water. And 800 million are hungry.

Pretty big numbers. Quite frankly, I can't really grasp what they mean. 1 billion people without water, 800 million people going hungry. These are statistics that I have a whole lot of trouble visualizing.

To me the human face of development is Yen, a farmer in, Bolgatanga, northern Ghana. Northern Ghana is a few hundred km away from the sun-baked Sahara. In Bolgatanga, the rains come for three months of the year. And during the other nine months blows the Harmattan – a dry wind from Egypt that sweeps across the desert and sucks up any moisture in its path. So Yen has three months to plant and harvest his crops – cassava, yams, perhaps some rice or vegetables. When the rains are late or sparse, he knows that he will not have enough food for his



family at the end of the year. He will be forced into a tough decision: keep his final few seeds to sow next year's fields, and have his family go hungry, or eat the seeds and – well, what then?

To me, that is the human foundation of development. That Yen has the right not to look at the sky hoping desperately that the rains will come. He has the right not to be forced into what would surely be one of the hardest decisions anyone in this room has ever taken and which has become commonplace for Yen.

III The role of technology in reaching the Millennium Development Goals

As engineers, as problem solvers, we look at these problems and want to help. And the first question to ask is what is the role of technology in reaching the Millennium Development Goals.

However, if you pick up literature on development you'll quickly notice that the word technology seems to have been forgotten. Today's development is about institutions, governance, corruption and markets; all concepts that are important, don't get me wrong. But the reality is such that technology is still front and center on the ground.

In every hand pump that will be built for the billion people without access to clean water.

In every irrigation project to help the 800 million people who go hungry.

In every manufacturing company that will be the backbone of economic growth, and in every electrification initiative for the 2 billion people lacking electricity.

Technology is there, front and center.

Recently, this has been increasingly recognized. To identify how to fulfill the Millennium Development Goals, Kofi Annan created the Millennium Project, ten task forces charged with addressing the underlying issues of development. The task force on Science and Technology – chaired, incidentally, by a member of EWB's advisory board – has identified the underlying role that technology plays in meeting almost all the goals.

IV How EWB is contributing to help solve the Millennium Development Goals.

The next question is how Engineers Without Borders is contributing to reaching the Millennium Development Goals. Let me share with you some information about us.

It is indeed an honour to be here before you today. Three years ago a friend and I had the idea, came up with the name, and wrote the first business plan on the back of a napkin in a coffee shop in North York. Even last year, we were working from a combination of my basement and a cubbyhole in my father's business.

Today, I'm taking time out from a pre-departure training session for 14 more young volunteers going overseas, adding to our 40+ alumni who have returned from – or who are still on – assignments. This afternoon I'll return to our new office where 11 people are working full time over the summer to build this organisation. Of course, for most people, working full time implies a salary. Three of those 11 are salaried – though none of us has actually been paid yet this year because spending money on projects is much more exciting than spending money on salaries! The others have taken leaves of absence from their job, are working second jobs to pay their bills, or are scraping by on HRDC grants that provide up to a whopping \$270 per week.

And what have we accomplished?

3500 members across Canada.

20 chapters at universities from St. John's to Victoria.

An Advisory Board that includes leaders from around the world and in Canada. The Head of the World Federation Engineering Organizations. The Secretary General of the OECD. The Director



of the UNDP's Human Development Report. The former CEO of Bell Canada. His Excellency John Ralston Saul. And this list continues.

In 2001 our budget was \$2500 dollars, not including the \$10000 that was charged to my credit card to get the first volunteers overseas. This year we are trying to raise half a million to continue to have impact overseas.

And what exactly is that impact? We work with partners in basic areas: food security, water and sanitation, energy. But this technology is not what you would expect – its at a much smaller scale than many of you would first imagine. Technology in development is about orders of magnitude. What we do is an order of magnitude less complicated than what our volunteers are trained for in Canada. And it takes an order of magnitude longer to be implemented. And the social, political and culture context in which the technology is being implemented is an order of magnitude more important to consider.

So, what exactly is Engineers Without Borders?

It's a group of people who believe in a world of opportunity, dignity and freedom, where all people can meet their basic human needs and attain their full potential.

It's a group of people who see a world where billions of people struggle to build their lives in the face of much adversity and the multi-faceted dimensions of poverty.

And it's a group of people who, as engineers, believe in the power of technology to drive extraordinary change. It's a group that understands that technology is embedded in the social, cultural, economic and political context of a myriad of different, local regions, but who believes that if technology is appropriately harnessed, it can play a major role promoting human development.

Collectively, we channel our knowledge, volunteer time, skills, financial resources, and voice to help, directly or indirectly, our fellow humans in the poorest communities in the world.

That is the essence of EWB.

But let me talk more concretely.

The name Engineers Without Borders immediately conjures up ideas of engineers rebuilding communities torn apart by disasters. This, sadly, is a false image. There are already many groups that undertake disaster relief and are doing a terrific job. Instead, EWB has made a very conscious decision to focus on the very different challenge of long-term development work.

Our evolving focus is on building capacity with the technical sector – small NGOs or local entrepreneurs. The goal is to ensure that affordable, appropriate and sustainable solutions to people's problems become locally generated and locally available. For example, on a past project of ours in Burkina Faso our volunteer was working with a local entrepreneur who builds Shea Nut grinders to sell to women's cooperatives who can then improve the efficiency and quality of their work, and therefore increase their incomes.

I should step back for a moment to emphasize that, in this work, we recognise that technology is embedded in the local social, cultural, economic and political context. And that our engineering training here in the west must frequently be "unlearned". That is, the way we approach problems in Canada often does not work in development. Consequently, the assets we seek in our overseas volunteers are not exclusively hard technical skills as much as humility, patience and the ability to listen and learn.

We also recognize that our actions at home are as important as our work overseas. We promote awareness and knowledge of world development and global sustainability among our fellow citizens. And we link these issues to actions that people can take in Canada. This, indeed, is one



of the greatest contributions that a westerner can make – to remove the barriers to human development that are rooted in our own country's policies and practices.

The OSPE has been our partner in getting the messages of Development and of Engineers Without Border out to the engineering community here in Ontario, and I would like to thank you for buying into a vision and growing with us. I remember the first time I sat in a room with Stephen Jack and Alex Gill. And at one point we were talking about the mandate of the OSPE. One part of this mandate was to take the muzzle off engineers and to give our profession a voice. At this point in the conversation I stated that if engineers were going to have a voice, then we needed a human face. And that is where Engineers Without Borders comes in.

V Other Benefits of EWB

With the advent of high-tech, high precision warfare, such as the recent conflict in Iraq, you have certainly heard the term collateral damage; essentially, unintended damage as a result of the war aims. In Engineers Without Border, we like to talk of the collateral benefits of our work. In particular, one of the collateral benefits of Engineers Without Borders in Canada is the human face that we represent for engineering, specifically in terms of diversity and public perception.

No one in engineering is unaware of the lamentable lack of women in the profession. Engineering schools still see enrollment stagnating at 20, or maybe 25% women. Engineers Without Borders, on the other hand, is roughly 50% women. If you look at those numbers, that means that a women engineer is 4-5 times more likely to be attracted to EWB than a male engineer. As we increase our outreach to high schools, we are hoping to show young women that engineering can be an attractive option for them.

Second, I don't think that many people here would disagree that public perception of engineering is not as positive as doctors or teachers. And maybe this is because of a few too many cheers or beers in the first few years of university. But we often remain invisible behind closed doors, designing and building things that make society work. Well, in the past 10 months, we have had over 100 publications featuring engineers. These have included media sources such as TIME Magazine, MacLean's, The Globe and Mail, the National Post, The Toronto Star, The Discovery Channel, CanadaAM, CBC Radio – the list goes on. Gradually, we hope to contribute, in our own little way, to making the human face of engineering more prominent.

VI Some challenges that EWB faces in our work overseas

These are some of our successes as an organization.

But before concluding, I wanted to say a few words regarding the challenges that we face. There are some interesting lessons to be learned from the history of technology in development. In the 50s and 60s and 70s, technology was at the forefront of development; recently, it has become a pariah. The reason is that most problems involve much more than just engineering, and that an excessive focus on technology dooms any project to fail. Take the fourth Millennium Development Goal: reducing infant mortality.

One major source of child illness is water-borne disease. Reducing morbidity requires a three-pronged approach: Addressing water quality, addressing sanitation, and addressing hygiene practices. The installation of a handpump won't do much to reduce infant mortality if dirty hands contaminate the clean water. And likewise, a handpump won't function for very long without a village committee to maintain it, and a local repair person who can service it periodically.

In trying to reduce infant mortality, engineering, social marketing (for hygiene promotion), community building and micro-economics all play an inter-related role. This speaks to the need to not only educate our engineers in Canada to make them technical leaders, but to continue the



trend of building the soft skills that are necessary to have broad impact. And this need is prevalent not only in development, but also as engineers function as citizens here.

A second challenge we face is a fundamental question about the role of westerners in development. Our immediate, natural, human reaction is to think “Yes, I have skills that are helpful; I would like to go to Cameroon, for example, and help.” But who among us stopped to ask whether perhaps our presence in Cameroon is actually taking a job away from a very capable engineer already in the country. And who among us has thought through the question of what are the attributes of a good development worker, and do we possess them? And who is committed to the reality that this starts with a multi-year commitment to learn the necessary social, political, cultural, anthropological and economic context of development?

What we do know is that we can build our knowledge, change our attitudes, and improve our practices to live more sustainably and to help, from here in Canada, people in developing communities. Is it sexy? No. Is it necessary? Yes. A challenge I’ll leave for you.

VII Conclusions and thanks

I opened my talk asking about the founding of engineering, and concluding that there was no defining moment, no genesis, no Eureka, from which engineering was born. I would like to explore this a little more. Let’s think back to the seven wonders of the ancient world: The Colossus at Rhodes; The Lighthouse at Alexandria; the Great Pyramids of Giza; the Temple of Artemus; the Mausoleum of Helicarnasus; the Hanging Gardens of Babylon; and the statue of Zeus at Olympia. In at least 5 of the 7, I’d say an engineer played a pretty major role. But one observation struck me: only one of these seven wonders was functional – the Lighthouse.

I fear that engineering today risks going down such paths. We have tremendous power of problem solving, and we are helping society make fundamental advances. But do we realize the power that our problem solving can have on the most complex, real and human problems in the world?

But development is not just important for humanity – its important for us as humans. You may have wondered why I brought my computer in and went to the trouble of setting it up. Well, its for one picture. Whenever I’m doubting what I’m doing, whenever I question the ideas of development, I turn to this picture.

These children are from western Cameroon. And the bike they are standing with was built entirely by these children from scrap wood and with only rudimentary hand tools. Other than being a pretty cool engineering design, this picture represents a number of things for me.

First, I look at these children and I think that if circumstances were different, these could be my brothers or cousins. If circumstances were different, these kids could be your sons or your nephews. And wouldn’t you be proud. They have the drive to escape poverty. And they have the skills. And they prove to me that development is possible.

And from that hope overseas I turn to the hope here in Canada. Let me ask again: do we realize the power that our problem solving can have on the most complex, real and human problems in the world? I know that our young engineers do and I hope I’ve given you a flavour of their work and their passion and the pragmatism that they exhibit. And I hope that you now share with me Engineers Without Borders’ potential to have a marked impact on reducing world poverty.

Meeting the MDGs is humanity’s most pressing work in the next dozen years. And, while there may be few engineers in the spotlight, our brother and sister engineers overseas will keep building those handpumps and starting-up those small businesses. And our son and daughter engineers-in-training will continue building those wooden bicycles. And we at Engineers Without Borders will keep trying to support and foster them until we’ve worked ourselves out of a job.



I thank you as individuals and as part of the OSPE for your continued support of Engineers Without Borders, and for your time this afternoon.

