

# The Structural Flaw in Engineering

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Alex Conliffe at McGill University in Montreal, Tom Owen at the University of Victoria, Bud Sambasivam, Chad Hamre, and Levi Goertz at the University of Saskatchewan, Ka-Hay Law and Robin Farnworth at the University of British Columbia. They were all early leaders in EWB, having heard about the organization through a variety of channels. Some had met George in person and were swept up in his enthusiasm, others had stumbled on the EWB website during a Google search, others had read articles that their mothers had clipped out for them (“My son’s an engineer ... and he cares about the world ... maybe he would be interested in this EWB thing!”), or had heard about EWB through a friend.

These student leaders were ready to put down their textbooks to focus on kickstarting the first generation of EWB chapters. There was latent potential in the engineering community, and it was EWB’s student members who were making it their business to tap into it.

Bud Sambasivam remembers what a thrill it was for him to hear, for the first time, about an engineering organization that combined a social mission with leadership skills. It happened when he travelled from Saskatoon to Calgary for a Canadian Federation of Engineering Students conference, where he met David Damberger. David was on a mission to convince EngSoc's [the Engineering Society] best leaders to jump ship and head to EWB.

“I thought, ‘I can develop as a leader AND make a difference and contribute to something larger??’” Bud says. “I said to myself, ‘See you later, EngSoc, I’m going to EWB.’”

## **“We are harnessing the power of the Canadian engineering profession”**

“International development had never entered my realm of consciousness,” Ka-Hay Law says, thinking back to her undergraduate degree. Yet throughout school she kept thinking that engineering seemed one-dimensional and incomplete. When someone told her about EWB, she went onto the EWB website and “devoured it”.

“This is what I’ve been missing!” she thought to herself. Finally, a taste of the bigger picture: a way to use her skills and abilities for social good. “I think people want to contribute to social change,” Ka-Hay says, “but they haven’t found the opportunity.”

With EWB, we set out to change that. There were numerous opportunities for students in other disciplines to get involved in social issues, but none of these existing organizations had broken through into the engineering student body. Capturing this audience was one of the most powerful things EWB has been able to do. Getting a crowd of people who never would have been interested in development or poverty and getting them to start thinking about it. To start examining what it means to incorporate a sense of justice into engineering. To start caring. To start acting.

From the earliest days, our business plans at EWB articulated this goal of recruiting a whole new section of society to the cause of international development. From EWB’s 2002 plan:

**EWB will always be at the forefront of introducing and exciting engineering students to international development. We need a passionate, pragmatic, energetic, and thoughtful member base. We mobilize the energy of engineers, educate them about development issues, and encourage them to play an active role supporting development. By doing so, we develop Canadian engineers into leaders committed to development and global sustainability.**

If we got EWB right, all of this latent potential could be unleashed. What difference would we be able to make if engineering students and the engineering profession – thousands of people across Canada – suddenly had an avenue to show their passion and commitment to social causes?

## **“There was a low rumbling of excitement throughout the entire student body”**

Students at the University of Saskatchewan arrived on campus one day in fall 2002 and stared at the huge signs that had popped up overnight. “It’s coming!” the signs shouted. They were everywhere – hanging in hallways, taped on classroom doors, tacked onto bulletin boards.

A few weeks later, as the leaves were turning and the weather getting colder, more signs appeared. “E”, these signs read. Nothing else. Some students were ignoring the signs: some stupid advertising gimmick, they thought. And other students were buzzing with curiosity. What on earth was coming, and who was behind it?

Later on that month, as the first frost came, more signs appeared, with a big “W” on them. And finally, with a big “B”. Throughout the campus: “It’s coming! EWB”. Levi Goertz and Chad Hamre, two of the people secretly behind the campaign, were stoking students’ curiosity in all their conversations. “Hey, what is this EWB thing? Does anyone know what it’s about?”

After three months of stealth marketing, USask got the final poster plastered all over campus: it had a date, a time, a meeting place, and one simple instruction: “Be there.”

When the night arrived, Engineering 1B71 had standing room only, and three TV stations had sent crews to cover the event. 150 people - a full 15% of USask’s engineering student body – had shown up. Sporting the EWB USask logo that Chad had designed, four EWB leaders took the stage to talk about the potential for EWB at their school.

Levi took the microphone last, with just a single powerpoint slide: a picture of a heart. “We put up the heart and I gave my rant,” he says,

“my rant on society and engineers and how engineers are making heated leather seats and making video games more realistic, rather than doing things that really matter.”

60 people bought paid memberships on the spot, and a full 100 were excited and ready to do something. Levi’s impassioned plea had struck a chord with the audience, who finally knew what had come to their campus. It was EWB, and they had a job to do.

## **“This would be no small job, but so what? You people are engineers”**

Meanwhile, as we set up meetings and met with other development organizations at the EWB national level, we kept running into a disturbing theme: we met too many groups that seemed stalled by the overwhelming task before them, people who no longer believed problems could be solved. Early on, the core team of EWBers promised ourselves that this would not happen at EWB. We took the stand that the problem-solving, can-do training that engineers receive could be incredibly powerful when applied to development.

It would be a challenge. We needed to start with engineering’s problem-solving mindset as a base, and then add in that elusive missing ingredient: a passion for making the world a better place, an awareness of the crushing poverty faced by billions of people around the world, a determination that we could participate in bringing an end to this injustice. We named the approach we were striving for: passionate pragmatism.

At EWB’s second conference, in Waterloo in 2003, John Watson, then the CEO of CARE Canada, spoke to the conference delegates about how much value their practicality would bring to development. The analytical engineering education was already proving itself indispensable to CARE – at the time, three of their ten country offices were run by managers who had been engineers – and John was convinced that the engineering approach had a place in development.

But how would we apply this approach? At first, we thought our role would be technical – after all, engineers can build roads, build bridges, create communications infrastructure, design water and sanitation systems, manage projects – and we thought that all of these things

must be needed in developing countries. Our mission in 2001 reflected this: “EWB-ISF will work to improve the quality of life of people in developing nations by helping find appropriate technical solutions to their challenges.”

We were researching cheap water filtration systems, solar-powered refrigeration, mobile IT centres, bicycle generators, and more. One chapter experimented with biogas generation during a cold January in Montreal. They built the digester and then went about their search for biogas fuel – a.k.a. cow dung. They spent hours in the rural areas surrounding Montreal, talking to farmers, until they finally found a good quantity of the prized fuel and brought it back, triumphant, to their student apartment. They filled the biogas digester, and waited. It was a cold night and the cow dung was frozen, so little digestion was happening. Figuring that this would take awhile, they showered and turned in for the night, still smelling faintly of manure. While they slept, though, the cow dung started thawing more and more rapidly, and as it warmed up, their biogas digester kicked into action. The digestion accelerated with the increased temperature, and then, in the middle of the night, there was a loud bang and the digester exploded, spraying cow dung throughout the apartment. It might have been a cool technological idea, but at that moment, it was hard to qualify this project as a success. Cow dung aside, many of those first brainstormed ideas never materialized, but as we did more research we started asking better questions about the role of technology in development. As engineers, we had been taught to always define the problem before trying to find the solution. We realized that when we had started EWB, we had defined the problem wrong.

We had begun by stating that, as engineers, surely there was something we could bring to development. Slowly, we realized that we needed to flip this assumption on its head. We needed to begin by asking not,

“What do we bring?”, but instead, “What do communities need?” It was only through answering this second question that we could begin to understand our role.

It wasn't the type of engineering that we'd expected to do when we began Engineers Without Borders. Traditional engineering skills alone, we discovered, would not be enough. Good engineering involved understanding how people use technologies, and how technologies are embedded in society. Our problem definition needed to include technology, but also go beyond it. We needed to include justice and equity. Culture and anthropology. Economics and politics. To be successful, EWB would have to bring in all of these perspectives – and we would have to do so without losing the engineering core that would prove so useful in development.

Sophia Wong, an environmental engineer who had spent a year on a development internship in India, was passionate about creating education materials to help engineers learn about these issues. She put together a variety of workshops, all of which started from the engineering premise that technology was central. But as participants went through the activities, they started to see that it was often non-technological factors that drove the success or failure of development initiatives. In a workshop about the Green Revolution, participants explored the economics of fertilizers and increased yields. In a role play on tomato production in northern Ghana, participants saw how hierarchy, prestige, cultural norms, and production chains affected the economics of tomato import and export. And the now infamous “Root Causes of Poverty” exercise has, over the years, had thousands of EWB members wrack their brains to find the linkages and circles within the proximate and ultimate causes of poverty.

Initially, we worried about how engineers would respond to this complex

approach. Would they embrace it, or retreat back into technological determinism? As always, EWB members were ready to be challenged and curious about moving beyond traditional engineering. As they learned more about these issues in EWB, members began lobbying their engineering departments to allow for more non-engineering electives. Through EWB, they were finally finding a way to combine technical aptitude, social consciousness, and a multi-disciplinary approach.

**“A year of EWB learning was transformational for me. I went from having spent 20 years believing ‘I need to provide and give to communities’ to ‘We need to work in partnership with communities and take time to understand their complexity.’”**

**– Samina Hashmi, chapter member, Junior Fellow, and national office staff member**

Sara Ehrhardt, who had hoped that in EWB she could help create an organization that would do things differently, felt that her dream came one step closer to reality through this member learning program. Sitting in a workshop, watching engineers argue about gender norms and adequate representation of women’s decision-making in a community project, she realized how far beyond technology we had gone. We were reaching our potential to be and do something different. 💡

