

The engineers

Passionate young engineers find solutions for a sustainable future, writes **Andrea Zavadszky**



Our world is developing quickly and our ability to find solutions can't seem to keep up with the number of problems we face. As soon as we find cures for some illnesses, others surface, while answers to our environmental problems lag behind the new challenges scientists keep discovering.

That's why it's vital for our educational institutions to nurture young people who are informed about the latest problems and are passionate about solving them, to the benefit of mankind.

Such thoughts have led Chun Wo Construction to launch their Engineers Save the World Chun Wo Innovation Student Awards. The company wants to encourage students to come up with innovative engineering solutions that can tackle problems in developing countries.

"The next generation is very important for the future," explains Stephen

Lee Ka-lun, chief executive of Chun Wo. "We want to encourage them to develop an innovative and creative mindset, and encourage them to think about how to improve the living environment of people in the developing world."

The awards were launched this year to coincide with Chun Wo's 50th anniversary and incorporate a part of the company's mission statement that calls for improving people's quality of life.

"The awards match our objective. We call for engineers to save the world, the living environment, through innovation," Lee says, adding that the projects also have to address one of the 17 sustainable development goals that the United Nations established in 2016.

After the February launch, which included a briefing session attended by 70 students, the company received 30 submissions. The judging committee then selected seven

projects, and passed them to the jury panel.

Lee says the results were "quite satisfactory." The students were aware of the environmental problems and most of the projects were about clean water, sanitation, health and cheap power. "We want them to address real-world situations with projects that are immediately useful for people," he says.

The competition was open to full-time undergraduate and post-graduate students of local universities with teams of up to eight members. They were competing for three main prizes of Gold, Silver and Bronze, as well as three merit awards which acknowledged outstanding ideas. The Gold winner took the main prize of HK\$100,000, while the rest of the awards amounted to HK\$100,000 in total.

Gold prize winners Jill Leung and Lam Wah-shing, graduates of the City University of Hong Kong, say

they have learned a lot through participating in the competition, and are pleased to have the support of Chun Wo for their project for the coming year. The company will provide resources and technical assistance for their project, so they can bring it to fruition.

Leung and Lam have been working on their award-winning project, which aims to provide sustainable energy to villages and railway tunnels in developing countries by using wind turbines. They are working on modifying the existing wind turbine design to make a safer, smaller and more affordable model that can easily be set up in cities and the countryside. They named their design the "Twind Turbine."

Twind is a vertical-axis wind turbine composed of two different turbines. This allows it to operate under different wind speeds. It also has a shroud, which protects the turbine from damage, and boosts the wind speed as it enters the machine.



Photo: Edward Wong

“Twind Turbine is unique because it can be based in cities, and it also has railway applications. We studied the wind profile of railways and discovered that lower part has a low wind speed and the upper part has a higher wind speed. We want to catch both the high-speed and low speed wind. We want to catch the turbulence created by the train and create a net-zero energy tunnel. There is no wind turbine for use on railways on the market, and we have improved on existing experiments,” Leung explains.

She says that according to their studies in Africa, especially Kenya, there is still no electricity in rural areas. While Twind would primarily be set up along railway lines to provide electricity to the tunnels, it could use the excess electricity to enable small-community development.

Lam is working on a PhD in mechatronics, a subject which combines different engineering disciplines, and Leung works in the sustainability industry. They have taken their product to six competitions, including ones in mainland China and Canada, and they have found it useful to hear different opinions about their work.

The project can accomplish at least three of the UN’s sustainable development goals, such as affordable and clean energy, infrastructure development, and sustainable community development.

Leung and Lam want to add applications to Twind that make use of the turbulence created by trains. They thought of the idea after observing developing countries setting up or enlarging their railway systems, noting the difficulties they had building railways without electricity.

“Many developing countries want to develop their railway systems. The ‘Belt and Road’ countries’ main objective is also to build railways. But without electric power, we can’t use machines for railway development,” says Lam. “So this is a good opportunity for us.” Lam says that a lot of electricity is wasted in a railway system, and the duo want to harness this power with their Twind Turbine, which has specific added applications to do just that.

“We have put it through different competitions and the feedback has been good. Each competition has different judges, and they always raise very interesting questions, and their comments are valuable. The feedback from judges leads us to explore more. It is a very valuable experience that can’t be learned in class,” Leung says.

One of the judging criteria was business, and Lam says this helped him learn more about the subject. Leung says she has read 10,000 pages in two years for the project, and adds she has learned a lot about cooperation. “It’s not easy for me to cooperate with others, or listen to others’ ideas. Before, I just rejected them out of hand,” she admits. Lam adds they had some memorable arguments working on the project.



Photo: Xiaomei Chen

The feedback from judges leads us to explore more. It is a very valuable experience that can’t be learned in class

JILL LEUNG

CHUN WO INNOVATION STUDENT AWARDS ENGINEERS SAVE THE WORLD



(left to right) Jill Leung and Lam Wah-Shing pose with Stephen Lee, chief executive of Chun Wo Construction Holdings Company Limited and silver award winners Fernando Garcia Albert and Mashiat Lamisa from HKUST. Photo: Edward Wong

The duo has been carrying out simulations with engineering software, but there has been no chance to test Twind in a wind tunnel. Leung says if the real-life experiments go as well as the simulations, they will be close to being able to manufacture the Twind Turbines.

The silver prize winner MedEasy is a project of Hong Kong University of Science and Technology students. The entry was part of the ongoing Student Innovation for Global Health Technology (SIGHT) project, which started in 2014. Each year a new team of students takes it over, with some previous students remaining as volunteers. The product is an electronic medical record system (EMRS) that helps doctors who visit slums to identify and track patients, solving the problem of keeping electronic patient records at places where there is no Wi-Fi.

Team member Mashiat Lamisa, a student of life science, explains,

“Our product is a box that serves as a temporary server for use in mobile clinics. Before visiting the slums, doctors can download the patient profiles of that area and see the full history of every patient. When they return to the clinic, they can upload all the new entries to the cloud.”

The patient management solution combines engineering, technology and social sciences. Patient identification is enabled by an iris scanner, and the box can work for seven to eight hours. The MedEasy project has gone through several iterations, taking note of changes suggested by doctors, and is already in use in slums. The MedEasy team is now considering how to widen the box’s usage. “The system would be great to use in refugee camps,” says Fernando Garcia Alberto, a student in Global China Studies who is doing his second voluntary year with the team. The team has so far worked with two non-government organisations in Cambodia.

The MedEasy team are considering offering a basic version, which could work in any setting, and also developing personalised products. They also want to get an open-source licence and create a community which works to improve the electronic medical record system. Alberto says the team were inspired by all the work students have put into the project during the last four years and they felt responsible for making it a success. “It was impactful. We were motivated to keep it moving forward,” he says.

Lamisa says the most memorable moment was when the product worked as it should. She also felt motivated when working with the doctors in Cambodia, as she could see how patients’ lives were being changed. ■