

Development of Demining Machines To Restore Land Where Children Can Play Barefooted

Mr. Amemiya, the president of Yamanashi Hitachi Construction Machinery, has been involved in demining activities for more than a decade through the development of demining machines. At present, there are a total of 53 machines in operation in six countries. Moreover, as land cleared of landmines is now being used for agriculture and school sites, his efforts have become tangible.

This has been realized thanks to his strong passion to "restore land where children can play barefooted." In sympathy with his passion, Hitachi Construction Machinery shall be positively involved in the development of demining machines.

Devil's Weapons to Survive 50 years

Though more than a decade has passed since the Cold War ended, regional conflicts have not disappeared in the world. One of the weapons used in these conflicts are landmines. As the cost of a landmine is as low as 300 yen, it is widely used, and it is said that there are 110 million landmines in 83 countries in the world.



Buried landmine (Cambodia)

Once set, a landmine will be active for 50 years and will wait for victims even after the end of a war, regardless of whether they are soldiers or general citizens. For this reason, landmines are called the devil's weapons. Even today, landmines daily kill more than 70 people.

The Central Market was the Origin for Development of Demining Machines

Mr. Amemiya who was selling used construction machinery visited Cambodia on business in 1994. As it was not long



Visiting the central market to compile a documentary program for TBS Television

after the civil war ended*, he thought that used construction machinery would surely be needed. But what he saw at the central market in the capital, Phnom Penh, was the truly pitiful sight of landmine victims. Three years after the civil war ended, the central market was full of beggars. In the hustle and bustle, he tried to hand a dollar bill to an old woman with a girl and saw that the bill immediately got stained in red. The old woman had injuries from a landmine on her face, hands and feet and was still bleeding from her hand. Mr. Amemiya talked to her through an interpreter and found that landmines had also killed the parents of the girl. He could not contain his anger and started to think what he would be able to do for the citizens of Cambodia. He kept on asking this question to himself on the plane returning home and made his decision: "I'm a mechanical engineer. I will make machines to clear landmines and reduce the number of victims as much as possible."

Project to Develop Demining Machines Started in 1995...but Unexpected Difficulties Awaited

After returning to Japan, Mr. Amemiya brought the miserable condition of the landmine victims in Cambodia to his employees' attention and emphasized the need for the development of landmine removal machines. For a small company like Yamanashi Hitachi Construction Machinery with only about 60 employees, this was a very risky project, but the employees

*1 In October 1991, the "Coalition Government of Democratic Kampuchea" consisting of three factions, namely, the Khmer Rouge, the Sihanouk faction and the Khmer People's National Liberation Front and the Phnom Penh government led by Heng Samrin signed the Paris Peace Agreements to end the civil war. But the Khmer Rouge boycotted an UN-supervised election, refusing to recognize the new government and continued their guerrilla campaign.

agreed that they should implement it. In 1995, a project team for the development of demining machines consisting of 6 engineers was founded. Mr. Amemiya didn't have any knowledge of landmines and started his mission by meeting Ms. Sato, a representative of Japan Demining Action and people connected with the United Nations. He also revisited Cambodia, met Mr. Ramonturn, responsible for landmine clearance, and learned that cutting down grass and shrubs would also be important for clearing landmines. He actually visited minefields in Battambang province in the northwest of the country where the Khmer Rouge still retained some influence. Through these experiences, he came up with a concept of demining machines based on hydraulic excavators equipped with a high-speed rotating cutter attached to the arm of the excavator. The key technology of the concept is the blade called "bit" to be mounted on the rotating cutter. It must have excellent cutting performance against shrubs as well as abrasion resistance and durability. Moreover, it must withstand heat as high as 1,000 degrees centigrade when the landmine explodes. Trial and error experiments were conducted using commercially available bits and custom-made bits, but the desired performance was not obtained, almost forcing them to give up their efforts. Without encouragement from Ms. Sato and Mr. Seguchi, former Chairman of the board (then president of Hitachi Construction Machinery), the project might have been abandoned. The team kept on improving the design and finally in 1998, the first antipersonnel demining machine was completed.



Rotating cutter of the landmine removal machine

Passing the On-site Test Led to the Path to Supply Products

In 1999, thanks to assistance from the CMAC (Cambodian Mine Action Center), the first on-site tests of the demining machines were conducted on such test points as safety and durability. The final test carried out in this opportunity was to explode the landmine using the rotating cutter. In this test, Mr. Amemiya himself operated the demining machine. These development efforts truly risked their own lives. Passing a variety of tests, two antipersonnel demining machines were supplied to Cambodia through the Japanese government's grant aid. Since then, the company has supplied a total of 53 antipersonnel demining machines to 6 countries including Vietnam and Afghanistan.

Helping to Remove Landmines to Create a Land of Peace



Agricultural training center built on land cleared of landmines

In Fiscal 2005, the company also supplied an additional antipersonnel demining machine equipped with a metal detector to Nicaragua in Central America. In the country, after landmine clearance, the land was



Mr. Amemiya visiting a school in Cambodia

used for orange plantation, which is now able to export a total of 600,000 cases or 1.5 million dollars worth of oranges. They also started to cultivate coffee and vegetables grown on the highlands. Mr. Amemiya visited the area after landmine clearance in the state of Preah Vihear, Cambodia, and found that a school as well as farm and an agricultural training center were built on the land. A decade after they started to develop the demining machines, Mr. Amemiya's dream has finally started to come true.

Development of Demining Machines Continues

The antipersonnel demining machines with a rotating cutter head could not handle antitank landmines and other large landmines. To solve this problem, under development are flail hammer type demining machines using weighted chains. Moreover, the company is also attempting to develop push type flail demining machines*2 to quickly clear large areas of mines. They will be tested in Cambodia this July and onward



Demining machine in experiment using simulated landmines



Flail hammer type demining machine

*2 Demining machines that are actually hydraulic excavators equipped with flails in front of the main body. They are characterized by the capability to conduct demining while moving.



Demining machine in operation in Cambodia