

Controlling Wildfires with Japanese Eco-Friendly Technology

Wildfires raging in the tropical rainforests of South America pose a serious problem. Now, a Japanese company, working with naturally-sourced soap, has developed an eco-friendly soap-based foam to fight fires. Field trials against wildfires are giving promising results.

The Shabondama Soap Co., Ltd., a soap manufacturer in Kitakyushu City, Fukuoka Prefecture, developed the world's first soap-based fire-fighting foam in 2007, in collaboration with other manufacturers, academic researchers and local governments. Because naturally sourced surfactant is used, the foam biodegrades rapidly, and

since the soap, the basis of the foam, binds with mineral components in nature, the environmental impact is greatly reduced, including its effect on nature and the ecosystem. Another advantage is that the amount of water needed to extinguish fires is significantly less than what would otherwise be required with water alone.

A request to develop a new type of

fire extinguisher unexpectedly found its way into the soap maker's office in 2001. Ever since the giant Kobe earthquake of 1995, considerable attention has been given to the idea of a fire-fighting foam that extinguishes fires with a reduced amount of water. However, the petroleum-based surfactants found in fire extinguisher produce foam with poor biodegradability, and when that



Field tests on peatland fires in Indonesia. With its high osmotic force, the foam can extinguish all embers in the peat.



Top: The Fire Department of Kitakyushu, a city designated as a SDGs Future City in Japan, is proactively using the eco-friendly foam to fight fires. Right: A soap-based fire-fighting foam formulated from naturally-sourced soaps, made solely from vegetable fats and potassium hydroxide.

type of foam flows into rivers and rice paddies, the result is a serious loss of life among microscopic organisms in the water and soil. Sensitive to such environmental concerns, the Kitakyushu City Fire and Disaster Management Department placed a request with Shabondama Soap, which had already developed and produced a soap free of synthetic surfactants, fragrances, colorants, and other additives.

The path to development, however, was far from smooth. In order to satisfy technical criteria, such as not causing metals to corrode, and performing dependably regardless of temperature fluctuations, while still producing a suitable foam, a research group from the University of Kitakyushu was asked to participate, and over 800 formulations were tested over a 7-year period. Although he faced a long bleak period without any results, MORITA Hayato, president of the company, said, "We have a corporate culture that withstands setbacks." In 1974, under Morita's father, Mitsunori, the previous president, the company had switched from synthetic detergents to making and marketing additive-free soaps, but that product would not become lucrative for another 17 years.

That experience of acting on a strong conviction of "never selling anything known to be harmful to human health or the environment," with all the employees coming together to ride out the hard times, is a lesson that is still remembered.

Currently, field tests of the soap-based fire-fighting foam are underway to develop the most practical way of bringing its superior fire-extinguishing power and good environmental performance to actual wildfires in regions such as South America and Southeast Asia. In 2013-2015, as a project commissioned by the Japan International Cooperation

Agency (JICA), fact-finding surveys and verification tests were conducted in Indonesia on peatland fires. The survey found that "The soap-based fire-fighting foam can be an effective agent for extinguishing peatland fires because of its high fire-fighting performance and low environmental impact." Since 2017, JICA has also adopted this agent in a research project to verify its local use, and Shabondama Soap is attempting to popularize its use in broader context.

Soap-based fire-fighting foam can extinguish fires using less water, therefore addressing the problem of a lack of water available to douse flames in many wildfires. The foam also retains high permeability and helps moisture to reach embers buried within peat, thus also offering the potential to extinguish peatland fires that continue to smolder deep underground. Consequently, the foam holds the promise of being useful against different kinds of wildfires. "If an eco-friendly fire extinguisher becomes widely available, more of the natural environment will recover and eventually be passed on to our children. I feel a sense of mission, namely, that our technology can make a tremendous contribution to the world," says Morita enthusiastically. ✨



Morita, the president of Shabondama Soap Co., Ltd., eagerly shares his view, saying, "I want the foam to have a global appeal."