

The Safe Transportation of Slaughtered Livestock to Prevent Spread of Disease

Kyoto Prefecture



Background

Foot-and-mouth disease, an infectious disease that affects cloven-hoofed animals such as cattle, swine, sheep, and goats, is regarded as high risk and requiring maximum international attention. The foot-and-mouth disease virus is only 25 nanometres and remains stable even outside the animal body due to its simple structure. Outbreaks of the disease can cause enormous economic damage in areas and is not limited to the livestock industry (1.4 trillion yen in Britain and 235 billion yen in Miyazaki Prefecture).

As part of rapid efforts to prevent an epidemic after an outbreak of the disease, affected animals need to be disposed of mainly by slaughter and burial, under the Act on Domestic Animal Infectious Diseases Control. In response to cases in which it is difficult to secure land for animal burial, such as in urban areas, the agriculture ministry developed portable on-site rendering devices. It is now necessary to establish a safe method to transport animal carcasses to locations where rendering devices are available.

Purpose of Project

Due to a lack a preventative or treatment measures, the only practical response to an outbreak is to stop the spread of the virus by slaughtering all animals at any affected farm. However, as it is possible to spread the virus through the transport of animal carcasses, it was necessary to establish technologies to enable their safe transportation.

Outline of Project

Under an initiative designated by the agriculture ministry as a project to promote science and technology research for agriculture, forestry, fisheries, and the food industries, the industry-academia-government team consisting of Taiyo Kogyo, Kyoto Sangyo University and Kyoto prefectural government developed an airtight container for animal carcass transportation. The container can be stockpiled, has a high level of airtightness that can seal in ultrasmall viruses and is strong enough to contain and transport a cow weighing as much as 1 ton. Even if a cow is incinerated inside, no harmful substances are released from the container.

-The team achieved airtightness and strength at the same time thanks to expert craftsmanship that made good use of material features, including protective layers prepared for the hoof and head, an inner bag that can be heat-sealed and an outer bag that is welded seamlessly.

-The team used the feline calicivirus as a substitute for the foot-and-mouth disease virus and confirmed, with genetic-level analysis, the container's airtightness and its ability to prevent a pathogenic microorganism from spreading.

-The Kyoto prefectural government has considerable field knowledge with domestic animal disease control after experiences with outbreaks of highly pathogenic avian flu. Using this expertise the team were able to make suggestions regarding packaging and

transportation methods for the container, and collected basic data by conducting gas generation and incineration tests.

Features and Advanced Aspects

The container attracted attention from livestock hygiene personnel in Japan as it was an unprecedented device. After a joint patent application by the three team partners, Taiyo Kogyo began supplying the container for use in disease control exercises by local governments in Japan. In addition, the team filed an international patent application under the Patent Cooperation Treaty (PCT) and put the container on display at international events, including an academic conference, as part of efforts to provide information on the device and promote its use overseas.

April 2014

The three co-developers jointly filed a patent application for the container with the Japan Patent Office.

July 2014

The team held a training workshop for livestock hygiene personnel from across Japan, attracting 150 people from 29 prefectures.

April 2015

The three partners jointly filed an international patent application under the PCT.

June 2015

The team displayed the container at the International Poultry Pig Show and the International Symposium on Emerging and Re-emerging Pig Diseases.

Effects of Project

The team developed the "Disease Control Bag," a previously unavailable disease control device that can seal in pathogenic microorganisms and transport large domestic animals such as cows weighing 1,000 kilograms each, and created a system enabling the supply of the equipment as a

product. The three partners jointly filed an international patent application for the device under the PCT and promoted its use by holding training workshops and displaying the device at related events. As a result, 8 local governments and organisations have used the equipment in disease control drills or started stockpiling it in preparation for emergencies.



A training workshop attended by 150 people from across the nation (demonstration using a model cow)

Problems and Responses

◆Before Project Implementation

Once foot-and-mouth disease breaks out, the carcasses of slaughtered large domestic animals need to be transported safely. However, there was no equipment available that was airtight enough to contain the pathogenic organism that could be used for the transportation of large domestic animals such as cows and could also be stockpiled in preparation for emergencies.

Taiyo Kogyo, known as the provider of roof materials for the Tokyo Dome, has sophisticated technologies for membrane structures. However,

due to a lack of experience in the field of livestock hygiene, the company did not realise the demand for such equipment.

Using its wide-ranging field capabilities on livestock hygiene, including avian flu control, the Kyoto prefectural government provided information on the international situation on livestock hygiene, as well as related systems and needs. This helped establish interaction with the expertise and know-how of Kyoto Sangyo University's Avian Influenza Research Centre. In order to secure funds for research and development, the team successfully applied for agriculture ministry subsidies aimed at helping finance competitive research projects.

◆After Start of Project

Although the team shared a common idea regarding the basic concept for research and development, there were many things that needed to be studied and verified at every stage of research, including the selection of materials, their structures, deciding procedures for packing and transportation work, and verifying air tightness.

During discussions in on-site study sessions, which were held many times, the team paid attention to the respective strengths of its industry, academic and government members and conducted work in close cooperation. As a result, the team found robust materials and was able to create a highly airtight structure.

Outlook

A joint announcement of the development by the three partners attracted attention, since the container was an unprecedented disease control device. A training workshop held in July 2014 was attended by 150 people from 29 prefectures.

After the joint actions of filing a patent application in Japan and an international application under the PCT, the team made various efforts towards the wider use of the equipment in Japan and

abroad including putting the device on display at an international academic conference. The device has gained greater recognition in Japan, as seen in its use for disease control drills. The team plans to continue efforts for the even wider use of the device so that rapid containment systems are established in Japan based on stockpiling and mutual supplies of the devices.

Reference URL

<http://www.pref.kyoto.jp/chikusan/documents/bouekibagtokutyou.pdf> *Japanese

Contact

chikusan@pref.kyoto.lg.jp

+81-75-414-4985

Livestock hygiene control personnel at the Livestock and Poultry Division of the Department of Agriculture, Forestry and Fisheries, Kyoto Prefecture

The Establishment of a Packing Method

A set of disease control bags



Covering the hooves and head



Heat-sealing the inner bag containing the animal carcass with a handheld sealer



Putting the wrapped carcass in the outer bag and closing it



Packing completed, ready for disinfection



Loading the packed carcass onto a transport vehicle